



MICHIGAN

STATE AGRICULTURAL COLLEGE

CATALOGUE

1891--2



ROBERT SMITH & CO., PRINTERS, LANSING, MICH.



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CATALOGUE

OF THE

OFFICERS AND STUDENTS

OF THE

STATE AGRICULTURAL COLLEGE

OF

MICHIGAN,

TOGETHER WITH OTHER

GENERAL INFORMATION CONCERNING THE COLLEGE.

THIRTY-FIFTH YEAR,

1891-2.

AGRICULTURAL COLLEGE P. O., MICH.

PUBLISHED BY THE COLLEGE.

1892.

ROBERT SMITH & CO
PRINTERS AND BINDERS
LANSING, MICH



VIEW FROM PRESIDENT'S HOUSE.

COLLEGE CALENDAR FOR 1892-93.

1892.

Monday, February 22, Spring term begins at 8 p. m., the first week continuing through Saturday.

Friday, April 1, Examinations on half-term studies.

Friday, May 13, Spring term ends at noon.

Monday, May 23, Summer term begins at 8 p. m., the first week continuing through Saturday.

Friday, July 1, Examinations on half-term studies.

Friday, August 12, Summer term ends at noon for all but the graduating class.

Sunday, August 14, Baccalaureate sermon.

Tuesday, August 16, Commencement.

Monday, August 22, College year begins at 8 p. m., the first week continuing through Saturday.

Friday, September 30, Examinations on half-term studies.

Friday, November 11, Autumn term ends.

1893.

Monday, February 20, Spring term begins at 8 p. m., the first week continuing through Saturday.

Friday, March 31, Examinations on half-term studies.

Friday, May 12, Spring term ends at noon.

Monday, May 22, Summer term begins at 8 p. m., the first week continuing through Saturday.

Friday, June 30, Examinations on half-term studies.

Friday, August 11, Summer term ends at noon for all but the graduating class.

Sunday, August 13, Baccalaureate sermon.

Tuesday, August 15, Commencement.

Monday, August 21, College year begins at 8 p. m., the first week continuing through Saturday.

Friday, September 29, Examinations on half-term studies.

Friday, November 10, Autumn term ends.

1894.

Monday, February 19, Spring term begins at 8 p. m., the first week continuing through Saturday.

CALENDAR, 1892.

1892.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	1892.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	1892.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	
JAN.---	3	4	5	6	7	1	2	MAY---	1	2	3	4	5	6	7	SEPT.---	4	5	6	7	1	2	3	
	10	11	12	13	14	15	16		15	16	17	18	19	20	21		11	12	13	14	15	16	17	
	17	18	19	20	21	22	23		22	23	24	25	26	27	28		18	19	20	21	22	23	24	
	24	25	26	27	28	29	30		29	30	31	--	--	--	--		25	26	27	28	29	30	--	
	31	--	--	--	--	--	--		--	--	--	--	--	--	--		--	--	--	--	--	--	--	
FEB.---	--	1	2	3	4	5	6	JUNE---	--	--	--	1	2	3	4	OCT.---	--	--	--	--	--	--	1	
	7	8	9	10	11	12	13		5	6	7	8	9	10	11		2	3	4	5	6	7	8	
	14	15	16	17	18	19	20		12	13	14	15	16	17	18		9	10	11	12	13	14	15	
	21	22	23	24	25	26	27		19	20	21	22	23	24	25		16	17	18	19	20	21	22	
	28	29	--	--	--	--	--		26	27	28	29	30	--	--		23	24	25	26	27	28	29	
MARCH.	--	--	1	2	3	4	5	JULY---	--	--	--	--	--	1	2	NOV.---	30	31	--	1	2	3	4	5
	6	7	8	9	10	11	12		3	4	5	6	7	8	9		6	7	8	9	10	11	12	
	13	14	15	16	17	18	19		10	11	12	13	14	15	16		13	14	15	16	17	18	19	
	20	21	22	23	24	25	26		17	18	19	20	21	22	23		20	21	22	23	24	25	26	
	27	28	29	30	31	--	--		24	25	26	27	28	29	30		27	28	29	30	--	--	--	
	--	--	--	--	--	--	--		31	--	--	--	--	--	--		--	--	--	--	--	--	--	
APRIL.	--	--	--	--	--	--	1	AUG.---	--	1	2	3	4	5	6	DEC.---	--	--	--	--	--	1	2	3
	3	4	5	6	7	8	9		7	8	9	10	11	12	13		4	5	6	7	8	9	10	
	10	11	12	13	14	15	16		14	15	16	17	18	19	20		11	12	13	14	15	16	17	
	17	18	19	20	21	22	23		21	22	23	24	25	26	27		18	19	20	21	22	23	24	
	24	25	26	27	28	29	30		28	29	30	31	--	--	--		25	26	27	28	29	30	31	
	--	--	--	--	--	--	--		--	--	--	--	--	--	--		--	--	--	--	--	--	--	

CALENDAR, 1893.

1893.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	1893.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	1893.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
JAN.---	1	2	3	4	5	6	7	MAY---	1	2	3	4	5	6		SEPT.---						1	2
	8	9	10	11	12	13	14		7	8	9	10	11	12	13		3	4	5	6	7	8	9
	15	16	17	18	19	20	21		14	15	16	17	18	19	20		10	11	12	13	14	15	16
	22	23	24	25	26	27	28		21	22	23	24	25	26	27		17	18	19	20	21	22	23
	29	30	31						28	29	30	31					24	25	26	27	28	29	30
FEB.---				1	2	3	4	JUNE---					1	2	3	OCT.---	1	2	3	4	5	6	7
	5	6	7	8	9	10	11		4	5	6	7	8	9	10		8	9	10	11	12	13	14
	12	13	14	15	16	17	18		11	12	13	14	15	16	17		15	16	17	18	19	20	21
	19	20	21	22	23	24	25		18	19	20	21	22	23	24		22	23	24	25	26	27	28
	26	27	28						25	26	27	28	29	30			29	30	31				
MARCH.				1	2	3	4	JULY---							1	NOV.---				1	2	3	4
	5	6	7	8	9	10	11		2	3	4	5	6	7	8		5	6	7	8	9	10	11
	12	13	14	15	16	17	18		9	10	11	12	13	14	15		12	13	14	15	16	17	18
	19	20	21	22	23	24	25		16	17	18	19	20	21	22		19	20	21	22	23	24	25
	26	27	28	29	30	31			23	24	25	26	27	28	29		26	27	28	29	30		
									30	31													
APRIL.						1	2	AUG.---		1	2	3	4	5		DEC.---						1	2
	2	3	4	5	6	7	8		6	7	8	9	10	11	12		3	4	5	6	7	8	9
	9	10	11	12	13	14	15		13	14	15	16	17	18	19		10	11	12	13	14	15	16
	16	17	18	19	20	21	22		20	21	22	23	24	25	26		17	18	19	20	21	22	23
	23	24	25	26	27	28	29		27	28	29	30	31				24	25	26	27	28	29	30
	30																31						

STATE BOARD OF AGRICULTURE.

	RESIDENCE.	TERM EXPIRES.
HON. FRANKLIN WELLS, - - - - - President of the Board.	Constantine,	1895
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HON. I. H. BUTTERFIELD, - - - - -	Lapeer,	1893
HON. A. C. GLIDDEN, - - - - -	Paw Paw,	1895
HON. HENRY CHAMBERLAIN, - - - - -	Three Oaks,	1897
HON. EDWIN PHELPS, - - - - -	Pontiac,	1897

HON. EDWIN B. WINANS, Hamburg, Governor of the State, HON. O. CLUTE, Agricultural College, President of the College,	} <i>Ex officio.</i>
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Deputy Secretary.

B. F. DAVIS,
Treasurer.

HON. FERRIS S. FITCH,
Superintendent of Public Instruction.

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Professor of Zoölogy and Entomology, and Curator of the General Museum.

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Professor of Botany and Forestry, and Curator of the Botanical Museum.

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HENRY G. REYNOLDS, M. S.,
Secretary.

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Professor of Horticulture and Landscape Gardening, and Superintendent of the
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Professor of Military Science and Tactics.

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Adjunct Professor of Chemistry.

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Assistant Professor of Physics.

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Assistant Professor of English Literature and Modern Languages.

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Assistant Professor of History and Political Economy.

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Assistant Professor of Agriculture and Instructor in Animal Industry.

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Assistant Professor of Mathematics.

JUSTUS N. ESTABROOK, B. S.,

Deputy Secretary.

WARREN BABCOCK, JR., B. S.,

Instructor in Mathematics.

GILBERT H. HICKS, B. S.,

Instructor in Botany.

GEORGE A. GOODENOUGH, B. S.,

Instructor in Mechanics.

* CHARLES F. BAKER, B. S.,

Instructor in Zoology.

* Resigned, to take effect January 1, 1892.

* EDWARD P. SAFFORD, B. S.,

Instructor in Mathematics.

WILBUR O. HEDRICK, B. S.,

Instructor in English.

WILLIAM H. VAN DERVOORT, B. S.,

Foreman of Iron Shops.

ALFRED G. GULLEY, M. S.,

Foreman of the Horticultural Department.

ALBERT R. CURTISS,

Foreman of Wood Shops.

E. A. EDGERTON,

Engineer.

MRS. LINDA E. LANDON,

Librarian.

† KENYON L. BUTTERFIELD, B. S.,

Assistant Secretary.

THOMAS GUNSON,

Foreman of Greenhouses.

JOSEPH McCracken,

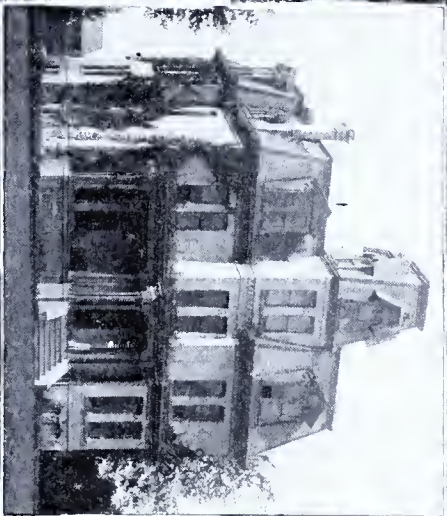
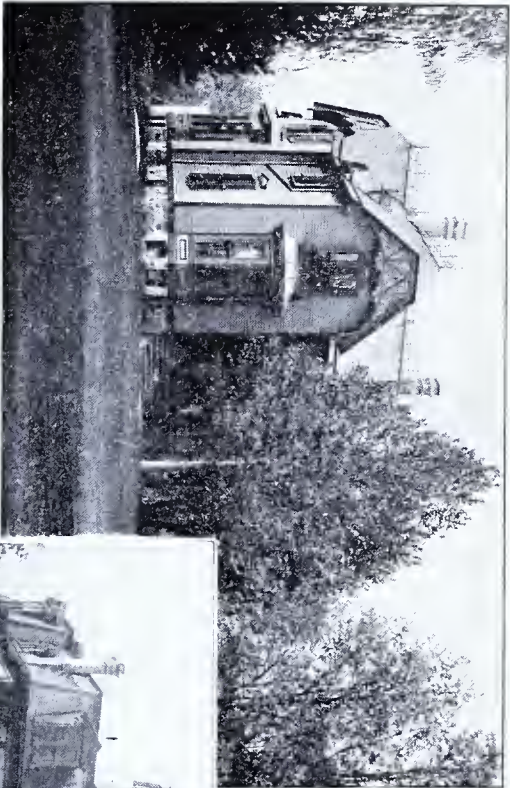
Foreman of the Farm.

WALTER D. GROESBECK, B. S.,

Assistant Secretary.

* Resigned, to take effect November 13, 1891.

† Resigned, to take effect April 1, 1892.



PROFESSOR OF ENTOMOLOGY,
PROFESSOR OF BOTANY.

RESIDENCES,
PRESIDENT.

SECRETARY,
PROFESSOR OF AGRICULTURE.

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ROBERT C. KEDZIE, M. A., M. D.,	Chemist.
HENRY G. REYNOLDS, M. S.,	Secretary and Treasurer.

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R. J. CORYELL, B. S.,	Assistant in Horticulture.
W. L. ROSSMAN, B. S.,	Assistant in Chemistry.
H. E. HARRISON, B. S.,	Assistant in Chemistry.
L. A. CLINTON, B. S.,	Assistant to Director.
MRS. L. E. LANDON,	Librarian.

DEGREES CONFERRED, 1891.

BACHELOR OF SCIENCE.

Names in italics denote Students in the Mechanical Course.

FRED W. ASHTON,	<i>Virgil S. Hillyer,</i>
CHARLES F. BAKER,	BERTO A. HOLDEN,
<i>William J. Breese,</i>	<i>Arthur H. Kneen,</i>
KENYON L. BUTTERFIELD,	ALFRED R. LOCKE,
CLAYTON T. COOK,	CHARLES P. LOCKE,
ROBERT J. CRAWFORD,	VICTOR H. LOWE,
EDWIN DeBARR,	GEORGE C. MONROE,
SAMUEL C. DONDORE,	HERBERT W. MUMFORD,
<i>William Enders,</i>	<i>Edward P. Safford,</i>
JESSIE J. FOSTER,	ALBERT C. SLY,
WILLIS A. FOX,	ALGERNON T. SWEENEY,
GRACE L. FULLER,	KOLAI S. THABUE,
<i>George A. Goodenough,</i>	CHARLES A. UDELL,
ALEXANDER F. GORDON,	GEORGE A. WATERMAN,
M. EDWIN GREESON,	MARIAN WEED,
WILBUR O. HEDRICK,	CHARLES F. WHEELER,
SUSANNA A. HILLMAN,	HENRY B. WINEGAR.

MASTER OF SCIENCE.

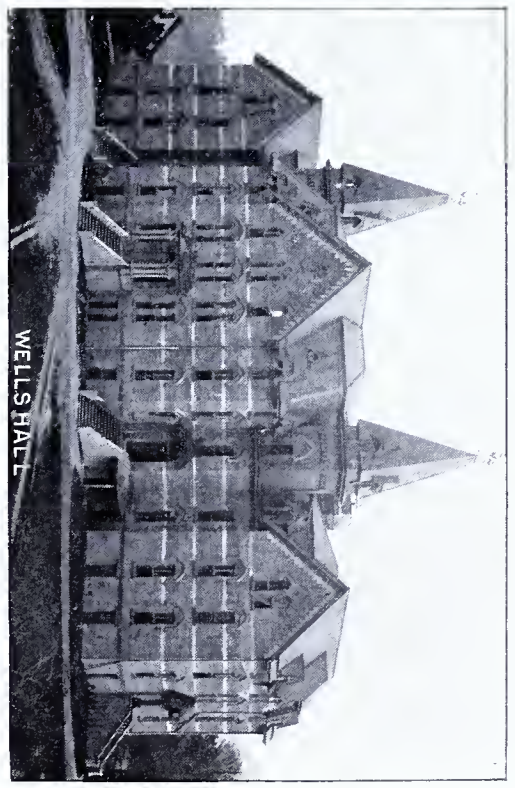
CHAS. F. EMERICK,	- - -	A. B., Wittenberg College, '89
FRED H. HILLMAN,	- - - - -	B. S., '88

HONORARY DEGREES.

Doctor of Laws,	- - - - -	{ JUDGE ALLEN B. MORSE, HON. EDWIN WILLITS.
Master of Agriculture,	- - - - -	HON. J. T. RICH.
Master of Horticulture,	- - - - -	HON. T. T. LYON.



WILLIAMS HALL



WELLS HALL



ABBOT HALL



HOWARD TERRACE

CATALOGUE OF STUDENTS.

POST-GRADUATES.

Kenyon L. Butterfield, B. S., '91	Agricultural College.
Louis A. Clinton, B. S., '89	Agricultural College.
Charles B. Cook, B. S., '88	Owosso.
Luella Creed, State Normal School, '90	Centreville.
Emily Fuller, State Normal School, '83	Caro.
Edward F. Gee, State Normal School, '86	Wayne.
Harry P. Gladden, B. S., '85	Agricultural College.
Alexander F. Gordon, B. S., '91	Halloway.
Alfred G. Gulley, M. S., '73	Agricultural College.
George E. Hancorne, B. S., '90	Gaylord.
Myrtie M. Haskins, B. L., U. of M., '92	Bronson.
Willia D. Hill, State Normal School, '88	Jonesville.
Ellsworth A. Holden, B. S., '89	Oviatt.
Warren C. Hull, B. Ped., State Normal School, '91	Albion.
Lyman M. Kellogg, State Normal School, '78	Tecumseh.
Victor H. Lowe, B. S., '91	Jackson.
Dora E. Matthews, B. L., U. of M., '87	Grand Rapids.
John W. Matthews, B. S., '85	Grand Rapids.
George E. Rogers, State Normal School, '91	Plainwell.
Henry O. Severance, State Normal School, '91	Lakeview.
Alva Sherwood, B. S., '81	Three Oaks.
J. H. Smith, B. S., '83	Chicago.
Alfred C. Snow, State Normal School, '88	Jackson.
George D. Sones, B. S., U. of M., '92	Grand Rapids.
Elias F. Tanner, A. B., Williams College, '58	Grand Ledge.
Nina C. Vanderwalker, B. L., Olivet College '91,	
B. Ped., Normal School, '91	Ypsilanti.
Herbert Williams, A. B., Olivet College, '90 ..	Charlotte.

SENIORS.

Names in italics denote Students in the Mechanical Course.

NAME.	COUNTY.	POSTOFFICE.
Howard B. Baker,	Ingham,	Lansing.
Albert N. Bateman,	Eaton,	Dimondale.
<i>Frank Bauerle,</i>	Emmet.	Petoskey.
<i>Thomas L. Bradford,</i>	Ingham,	Lansing.
<i>Louis C. Brooks,</i>	Ingham,	Agricultural College.
Leander Burnett,	Emmet,	Harbor Springs.
Charles M. Conner,	Ingham,	Agricultural College.
George W. Davis,	Calhoun,	Tekonsha.
George E. Ewing,	Kent,	Byron Centre.
Edwin J. Freeman,	MINNESOTA,	Winona.
Horace B. Fuller,	Ingham,	Lansing.
L. Colfax Gibbs,	Ottawa,	Grand Haven.
Albert H. Gillett,	Shiawassee,	Owosso.
<i>Walter D. Groesbeck,</i>	Ingham,	Agricultural College.
<i>Clarence A. Hathaway,</i>	Genesee,	Clio,
<i>George A. Hawley,</i>	Allegan,	Ganges,
<i>William P. Hawley,</i>	Allegan,	Fennville,
Gilbert H. Hicks,	Ingham,	Agricultural College.
John E. Hinkson,	Sanilac,	Amadore.
Mabel E. Linkletter,	Benzie,	Almira.
Thomas S. Major,	St. Joseph,	Centreville.
William E. Palmer,	St. Joseph,	Centreville.
Harvey N. Peck,	Jackson,	Jackson.
Bert W. Peet,	Saginaw,	Chesaning.
<i>Edward H. Polhemus,</i>	Eaton,	Charlotte.
<i>John L. Potter.</i>	ONTARIO,	Elora.
William K. Sagendorph,	Eaton,	Charlotte.
Arthur E. Stow,	Clinton,	Fowler.
Dor N. Stowell,	Barry,	Woodland.
*Kolai S. Thabue,	BURMA,	Waikema P. O.
David W. Trine,	Jackson,	Springport.
L. Whitney Watkins,	Washtenaw,	Manchester.
Harry Arnold White,	Kent,	Grand Rapids.
Charles R. Winegar,	Kent,	Lowell.

* Degree conferred November 1, 1891.

JUNIORS.

Names in italics denote Students in the Mechanical Course.

NAME.	COUNTY.	POSTOFFICE.
<i>Benjamin F. Bain,</i>	Emmet,	Petoskey.
Luther H. Baker,	Ingham,	Lansing.
George W. Benjamin,	Leelanaw,	Cedar Run.
<i>Sherman J. Blake,</i>	Kalamazoo,	Galesburg.
Lyman J. Briggs.	Barry,	Lacey.
Roy C. Bristol,	Lapeer,	Almont.
<i>Alton C. Burnham,</i>	Isabella,	Russel.
Reuben S. Campbell,	St. Clair,	Hartsuff.
Daisy Champion,	Ingham,	Lansing.
Claudius B. Chapin,	Kalamazoo,	Schoolcraft.
Albert B. Chase,	Van Buren,	Bangor.
Fred P. Clark,	Kalamazoo,	Schoolcraft.
Lucy M. Clute,	Ingham,	Agricultural College.
<i>Dwight Cole,</i>	Ingham,	Meridian.
Albert B. Cook,	Ingham,	Agricultural College.
Katharine E. Cook,	Ingham,	Agricultural College.
Frank W. Cowley,	Ingham,	Lansing.
Jennie M. Cowley,	Ingham,	Lansing.
Dick J. Crosby,	Oceana,	Elbridge.
Willard L. Cumings,	Kent,	Grand Rapids.
<i>John Bagley Dimmick,</i>	Iosco,	East Tawas.
John W. Dunn,	Ionia,	Pewamo.
<i>Gideon Ellis,</i>	St. Joseph,	Sturgis.
<i>Louis E. Frost,</i>	Ingham,	Lansing.
Harry M. Goss,	Allegan,	Plainwell.
<i>Harry K. Haak,</i>	Kent,	Grand Rapids.
Elmer B. Hale,	Ionia,	Orleans.
Oscar B. Hall,	Montcalm,	Greenville.
William L. Harvey,	WISCONSIN,	St. Croix Falls.
Ulysses P. Hedrick,	Emmet,	Harbor Springs.
<i>LaVerne Heesen,</i>	Lenawee,	Tecumseh.
Clarence E. Holmes,	Ingham,	Lansing.
<i>Willard F. Hopkins,</i>	Ingham,	Lansing.
<i>Robert M. Kedzie,</i>	Ottawa,	Grand Haven.

Names in italics denote Students in the Mechanical Course.

NAME.	COUNTY.	POSTOFFICE.
<i>Fred H. Kishpaugh,</i>	Lenawee,	Raisin Centre.
Charles W. Leipprandt,	Huron,	Hayes.
Walter F. Lyon,	Wayne,	Detroit.
James S. Mann,	FLORIDA,	Glenwood.
Warren A. Maxfield,	Ottawa,	Coopersville.
Ed. M. McElroy,	Kalamazoo,	Texas.
<i>Alvin K. Meyers,</i>	Kent,	Caledonia.
Wendell Paddock.	Berrien,	Three Oaks.
<i>Otto H. Pagelson,</i>	Ottawa,	Grand Haven.
Herbert F. Palmer,	Jackson,	Napoleon.
William W. Parker,	Eaton,	Charlotte.
Joseph Perrien, Jr.,	Wayne,	Detroit.
<i>John W. Perrigo,</i>	Ionia,	Portland.
Edwin C. Peters,	Saginaw,	Saginaw, E. S.
Robert B. Pickett,	Calhoun,	Albion.
Frank J. Porter,	Leelanaw,	Leland.
<i>John W. Post,</i>	Ingham,	Mason.
John R. Potter,	Ingham,	Dansville.
<i>John C. Sesser,</i>	Berrien,	St. Joseph.
<i>George E. Simmons,</i>	Jackson,	Hanover.
<i>Emile Smith,</i>	Wayne,	Detroit.
William G. Smith,	Livingston,	Howell.
<i>Valmore L. Steward,</i>	Ingham,	Agricultural College.
Alva T. Stevens,	Ingham,	Mason.
Cora Stocking,	Ingham,	Stockbridge.
<i>Bernard A. Stowe,</i>	Van Buren,	Hartford.
<i>E. Noyes Thayer,</i>	Kent,	Grand Rapids.
William W. Tracy, Jr.,	Wayne,	Detroit.
Robert S. Welsh,	Chippewa,	Stevensburg.
Mary Lillian Wheeler,	Ingham,	Agricultural College.
Justin T. Wight,	Allegan,	Allegan.
Orton E. Wilber,	OHIO,	West Unity.
Vernon J. Willey,	Ionia,	Pewamo.
Elmer F. Wolcott.	Ingham,	Lansing.

SOPHOMORES.

Names in italics denote Students in the Mechanical Course.

NAME.	COUNTY.	POSTOFFICE.
<i>Charles H. Alexander,</i>	Ionia,	Ionia.
Henry R. Allen,	Wayne,	Grosse Ile.
Walter S. Ashton,	OHIO,	Bryan.
Harry D. Baker,	WISCONSIN,	St. Croix Falls.
<i>Austin G. Baldwin,</i>	OHIO,	Columbus.
Cecil J. Barnum,	Eaton,	Charlotte.
Frank T. Beaver,	Berrien,	Niles.
<i>Arthur J. Beese,</i>	Saginaw,	Saginaw, E. S.
<i>Rupert A. Bentley,</i>	Calhoun,	Marshall.
Dwight A. Bruen,	Kalamazoo,	Kalamazoo.
<i>Harry C. Buell,</i>	Cass,	Little Prairie Ronde.
<i>Maurice Carney,</i>	Calhoun,	Battle Creek.
<i>Melzar M. Chaffee,</i>	Wayne,	Detroit.
Jay Chamberlain,	Wayne,	Flat Rock.
Sadie D. Champion,	Ingham,	Lansing.
Alfred W. Chase,	Wayne,	Detroit.
Gage W. Christopher,	Ingham,	Lansing.
John P. Churchill,	Berrien,	Three Oaks.
Otie M. Cook,	Shiawassee,	Owosso.
Anna C. Cooper,	Ingham,	Agricultural College.
<i>Ralph R. Cox,</i>	Kalamazoo,	Schoolcraft.
<i>E. Chauncey Crawford,</i>	Wayne,	Detroit.
<i>Wilbur J. Cumings,</i>	Kent,	Sparta.
Fred H. Elliott,	Barry,	Hickory Corners.
<i>Harlan S. Emlaw,</i>	Ottawa,	Grand Haven.
Royal C. Fisher,	Oceana,	Crystal Valley.
Clarence J. Foreman,	Emmet,	Harbor Springs.
Merritt W. Fulton,	Wayne,	Detroit.
<i>Tracy H. Gillis,</i>	Grand Traverse,	Traverse City.
<i>Clayton S. Goodwin,</i>	Washtenaw,	Dexter.
Orel S. Groner,	Clinton,	Riley.
<i>Charles R. Haigh,</i>	Kalamazoo,	Kalamazoo.
<i>Walter A. Hamilton,</i>	Branch,	Coldwater.
<i>Ralph Haskin,</i>	Lapeer,	Imlay City.

Names in italics denote Students in the Mechanical Course.

NAME.	COUNTY.	POSTOFFICE.
Archie D. Himebaugh,	St. Joseph,	Burr Oak.
<i>Oscar Hirth,</i>	Kent,	Grand Rapids.
William J. Howard,	Livingston,	Iosco.
<i>Ernest V. Johnston,</i>	Oakland,	Milford.
Frederick W. Lewis,	Osceola,	Evart.
Burton O. Longyear,	Ingham,	Mason.
<i>Malcolm F. Loomis,</i>	Kent,	Grand Rapids.
Ross R. Marble,	Ingham,	Webberville.
Duncan D. McArthur,	Tuscola,	Cass City.
Guy E. Mitchell,	DIST. OF COLUMBIA,	Washington.
<i>Hugh M. J. Mulheron,</i>	Wayne,	Detroit.
<i>John F. Nellist,</i>	Kent,	Grand Rapids.
<i>Lory F. Newell,</i>	Montcalm,	Howard City.
Chase Newman,	Ionia,	Portland.
Fred M. Nichols,	ILLINOIS,	Momence.
<i>John D. Nies,</i>	Allegan,	Saugatuck.
James E. Niswander,	INDIANA,	Brimfield.
Lavalette O'Neil,	Ionia,	Pewamo.
<i>Cyrus C. Pashby,</i>	St. Joseph,	Constantine.
<i>J. Cuthbert Patrick,</i>	Wayne,	Detroit.
Arthur L. Pattison,	Calhoun,	Marengo.
<i>C. Hollister Perrin,</i>	Shiawassee,	Corunna.
Edward E. Pettingill,	Benzie,	Oviatt.
Fred B. Phillips,	Wayne,	Detroit.
<i>E. Ralph Pierce,</i>	Ionia,	Belding.
Frank R. Poss,	Huron,	Caseville.
<i>Frederick L. Reynolds,</i>	Ingham,	Agricultural College.
<i>Herbert H. Rhodes,</i>	Ingham,	Lansing.
John W. Rittinger,	Berrien,	Dayton.
<i>Elmer E. Robb,</i>	Sanilac,	Buel.
D. Will Roberts,	Livingston,	Pinckney.
Thomas W. Rockwell,	Barry,	Hickory Corners.
Allen Rohr,	Emmet,	Cross Village.
Silas F. Scott,	Macomb,	Romeo.
Clarence B. Smith,	Montmorency,	Atlanta.

Names in italics denote Students in the Mechanical Course.

NAME.	COUNTY.	POSTOFFICE.
<i>Thorn Smith,</i>	Ionia,	Portland.
<i>Charles H. Spring,</i>	Ingham,	Lansing.
<i>Walter B. Stutsman,</i>	Emmet,	Harbor Springs.
Moses W. Stutz,	Barry,	Middleville.
Marcus P. Thompson,	Allegan,	Plainwell.
Harry W. Tracy,	Wayne,	Detroit.
<i>George T. White,</i>	Wayne,	Detroit.
William F. Wight,	Allegan,	Allegan.
Leroy A. Wilson,	Van Buren,	Lawton.
Robert S. Woodworth,	Huron,	Caseville.

FRESHMEN.

James C. Adams,	Huron,	Caseville.
Philip F. Amery,	WISCONSIN,	St. Croix Falls.
<i>William A. Anson,</i>	Kent,	Grand Rapids.
<i>Charles W. Appleton,</i>	Eaton,	Grand Ledge.
William C. Bagley,	Wayne,	Detroit.
George J. Baker,	Wayne,	Detroit.
Mary C. Baker,	Ingham,	Lansing.
Frank W. Black,	INDIANA,	Haw Patch.
Albert Blanding,	Kent,	Lowell.
<i>William E. Botsford,</i>	Clinton,	St. Johns.
James H. Briley,	Montmorency,	Vienna.
<i>James B. Brockway,</i>	OHIO,	Hartsgrove.
<i>LeRoy H. Brown,</i>	Calhoun,	Marshall.
<i>Joseph W. Busch,</i>	Marquette,	Marquette.
Robert W. Champion,	Ingham,	Lansing.
Floyd M. Chatterton,	Ingham,	Lansing.
Howard E. Chatterton,	Isabella,	Mt. Pleasant.
Harry J. Chatterton,	Isabella,	Mt. Pleasant.
<i>Horace G. Childs,</i>	Ingham,	Lansing.
Charles P. Close,	Berrien,	Three Oaks.
Frederick W. Cogswell,	Otsego,	Gaylord.
Orville W. Cole,	Clinton,	Fowlerville.
<i>Henry Colquitt,</i>	Wayne,	Detroit.

Names in italics denote Students in the Mechanical Course.

NAME.	COUNTY.	POSTOFFICE.
Clarendon J. Combs,	Otsego,	Elmira.
John W. Cooley,	Wayne,	Detroit.
<i>George B. Craw.</i>	Kent,	Lowell.
<i>Frederick W. Dewey,</i>	Kent,	Grand Rapids.
<i>Jay B. Dodge,</i>	Mecosta,	Morley.
Cornelius D. Dondore,	PENNSYLVANIA,	Strausstown.
Arthur Donovan,	Ingham,	Lansing.
Orlando Elliott,	Otsego,	Otsego Lake.
Elmer L. Ellsworth,	Livingston,	East Cohoctah.
Ernest C. Engle,	St. Joseph,	Centerville.
Thomas F. Farrell,	Wayne,	Detroit.
Loren P. Fimple,	St. Joseph,	Colon.
William Fisk,	Lenawee,	Addison.
Claude A. Frace,	Ionia,	Saranac.
Guy H. Frace,	Ionia,	Saranac.
Edgar L. Fugate,	NEW MEXICO,	Las Vegas.
<i>Walter J. Goodenough,</i>	Genesee,	Flint.
<i>George W. Graham,</i>	Gratiot,	St. Louis.
Edward C. Green,	Wayne,	Wayne.
<i>James M. Harvey,</i>	St. Joseph,	Constantine.
<i>Allan D. Hardy,</i>	Ingham,	Williamston.
Ernest J. Heck,	Allegan,	Burnip's Corners.
Fred G. Hicks,	Mecosta,	Morley.
<i>Harry Hodgman,</i>	Kalamazoo,	Climax.
<i>Arthur T. Humphrey,</i>	Saginaw,	Saginaw, E. S.
<i>Frank W. Hutehings,</i>	Ionia,	Lyons.
<i>Clement E. Jarvis,</i>	Ingham,	Lansing.
Robert E. Johnston,	Oakland,	Milford.
<i>Frank Johnson,</i>	Mecosta,	Paris.
<i>Jesse H. Johnson,</i>	St. Joseph,	Nottawa.
Harry K. Jones,	Barry,	Middleville.
Yasuharu Kato,	JAPAN,	Tokio.
James H. Kimball,	Wayne,	Detroit.
Kuyohide Kuroda,	JAPAN,	Tokio.
<i>Samuel C. Laitner,</i>	Wayne,	Detroit.
<i>Henry F. Lake, Jr.,</i>	Livingston,	Howell.

Names in italics denote Students in the Mechanical Course.

NAME.	COUNTY.	POSTOFFICE.
Swaby L. Lawton,	Van Buren,	Lawton.
John A. Lee,	Van Buren,	Bangor.
<i>Roy Littlefield,</i>	Wayne,	Detroit.
Gerrit Masselink,	Allegan,	Oakland.
Hattie McKenzie,	Ingham,	Stockbridge.
<i>Robert A. McKim,</i>	Ingham,	Lansing.
<i>Arthur C. McKinnon,</i>	Bay,	Bay City.
James Mitchell,	Genesee,	South Grand Blanc.
<i>Gilbert Nichols,</i>	Calhoun,	Battle Creek.
Albert M. Nutten,	Hillsdale,	Jerome.
Thomas L. O'Brien,	Gratiot,	Alma.
<i>Milton D. Owen,</i>	Allegan,	Douglas.
<i>Harrie R. Parish,</i>	Hillsdale,	Allen.
<i>Burton D. Parker,</i>	Wayne,	Detroit.
<i>George H. Phillips,</i>	Wayne,	Detroit.
<i>Charles W. Porter,</i>	Wayne,	Detroit.
Robert L. Reynolds,	Ingham,	Agricultural College.
<i>J. Clyde Riley,</i>	Wayne,	Detroit.
Charles H. Robison,	Washtenaw,	Milan.
Ernest A. Robinson,	Charlevoix,	Boyne Falls.
Clark E. Rogers,	Eaton,	Vermontville.
<i>George W. Rose,</i>	Mecosta,	Big Rapids.
<i>Ralph G. Root,</i>	ILLINOIS,	Rockford.
Peter V. Ross,	Livingston,	Howell.
<i>Edwin H. Rowley,</i>	Macomb,	Lenox.
<i>R. Justin Rote,</i>	Muskegon,	Muskegon.
George A. Sager,	Jackson,	Michigan Centre.
Ross A. Skinner,	INDIANA,	Albion.
Fred Small,	Benzie,	Benzonia.
Dan G. Smith,	Ionia,	Portland.
Howard R. Smith,	Hillsdale,	Somerset.
<i>William W. Smith,</i>	Allegan,	Douglas.
W. Clyde Stebbins,	St. Joseph,	Centerville.
<i>Burt D. Stevens,</i>	Tuscola,	Vassar.
Guy L. Stewart,	Otsego.	Gaylord.
<i>Evelyn E. Stone,</i>	Gratiot,	St. Louis.

Names in italics denote Students in the Mechanical Course.

NAME.	COUNTY.	POSTOFFICE.
<i>Halla C. Stone,</i>	Eaton,	Olivet.
Bradshaw H. Swales,	Wayne,	Detroit.
<i>George H. Swift,</i>	Emmet,	Harbor Springs.
<i>Stephen W. Tracy,</i>	Wayne,	Detroit.
<i>Edward C. Tryon,</i>	Cass,	Dowagiac.
Lewis H. Van Wormer,	Ottawa,	Jamestown.
John G. Veldhuis,	Allegan,	Overisel.
Charles S. Wardall,	ILLINOIS,	Tuscola.
Hugh E. Ward,	Kent,	Ada.
Cornelia Wardwell,	Ingham,	Lansing.
<i>Charles H. Watson, Jr.,</i>	WISCONSIN,	Milwaukee.
Henry F. Wellman,	Ingham,	Okemos.
Orson P. West,	Lapeer,	Deanville.

SPECIALS.

William F. Bernart,	Wayne,	Detroit.
John C. Butler,	Ionia,	Portland.
Katharine S. Clute,	Ingham,	Agricultural College.
Adelbert Dryer,	Ingham,	North Lansing.
Jay B. Foote,	Eaton,	Charlotte.
Theron A. Harmon,	Wayne,	Plymouth.
Edwin A. Hayden,	Branch,	Union City.
Mrs. Elva Hicks,	Ingham,	Agricultural College.
Mrs. Adelaide K. Holdsworth,	Ingham,	Agricultural College.
Yasuma Ishikawa,	JAPAN,	Tokio.
Maurice G. Kains,	ONTARIO,	St. Thomas.
Ella Pearl Kedzie,	Ingham,	Agricultural College.
Abraham Knechtel,	Saginaw,	Chesaning.
Clem C. Lemon,	Bay,	Bay City.
Mrs. Bertha McNair,	Ingham,	Agricultural College.
Henry H. Merriman,	Kent,	Alto.
William G. C. Merritt,	Calhoun,	Battle Creek.
<i>Vinton V. Newell,</i>	Ingham,	Agricultural College.
Omar Nichols,	Calhoun,	Battle Creek.
Mrs. Cora B. Noble,	Ingham,	Agricultural College.

Names in italics denote Students in the Mechanical Course.

NAME.	COUNTY.	POSTOFFICE.
Lizzie O'Connor,	Ingham,	Lansing.
<i>Fred S. Payne.</i>	NEW YORK,	Ticonderoga.
Myrtle Peck,	Ingham,	Agricultural College.
Sidney D. Peper,	Van Buren,	Berlamont.
Loa B. Renner,	Ingham,	Agricultural College.
Victor Sisung,	Monroe,	Newport.
<i>Ralph D. Thompson,</i>	Allegan,	Plainwell.
Clara Fay Wheeler,	Ingham,	Agricultural College.
Harry Winder,	Wayne,	Detroit.

SUMMARY OF STUDENTS.

	Agri- cultural.	Mechan- ical.	Special.	Ladies.	Total.
Post-Graduates.....	10	1	11	5	27
Seniors.....	24	9	-----	1	34
Juniors.....	40	22	-----	6	68
Sophomores.....	42	34	-----	3	79
Freshmen.....	60	45	-----	3	108
Specials.....	-----	3	16	10	29
Total.....	176	114	27	28	345

MICHIGAN STATE AGRICULTURAL COLLEGE.

ORGANIC LAW.

The Constitution of Michigan requires that "The Legislature shall * * * provide for the establishment of an agricultural school * * * for instruction in agriculture and the natural sciences connected therewith." [Revised Constitution, 1850, Art. XIII, § 11.]

The Laws of Michigan—Howell's Annotated Statutes—provide as follows:

§ 4988. This institution shall combine physical with intellectual education, and shall be a high seminary of learning in which the graduate of the common schools can commence, pursue, and finish a course of study terminating in thorough theoretic and practical instruction in those sciences and arts which bear directly upon agriculture and kindred industrial pursuits.

§ 4989. No student shall be admitted to the institution who is not fifteen years of age, and who does not pass a satisfactory examination in Arithmetic, Geography, Grammar, Reading, Spelling and Penmanship.

§ 4990. The course of instruction shall embrace the English Language and Literature, Mathematics, Civil Engineering, Agricultural Chemistry, Animal and Vegetable Anatomy and Physiology, the Veterinary Art, Entomology, Geology, and such other natural sciences as may be prescribed; Technology, Political, Rural, and Household Economy, Horticulture, Moral Philosophy, History, Book-keeping, and especially the application of science and the mechanic arts to practical agriculture.
* * * * *

§ 4991. A full course of study in the institution shall embrace not less than four years.

§ 4992. The academic year shall consist of not less than nine calendar months.

§ 4993. Three hours of each day shall be devoted by every student of the College to labor on the farm, and no person shall be exempt except from physical disability.

By a vote of the Board of Agriculture the hours of labor may be increased to four or diminished to two and one-half.

§ 4998. The board shall have power to regulate the course of instruction, and prescribe, with the advice of the faculty, the books to be used, and to confer for similar or equal attainments similar degrees or testimonials to those conferred by the University of Michigan.

§ 4999. The president, professors, farm manager, and tutors shall constitute the faculty of the State Agricultural College.

The president of the College shall be the president of the faculty, the secretary of the State Board of Agriculture shall be a member and secretary of the faculty.

Articles 5009 and 5010 donate to the College and provide for the disposition of certain swamp lands in the townships of Lansing, Meridian, DeWitt and Bath.

§ 5013. Military Tactics and Military Engineering shall be added to the course of instruction.

§ 5375. The interest on the United States Land Grant Fund shall be regularly applied, under the direction of the State Board of Agriculture, to the support and maintenance of the State Agricultural College, where the leading object shall be—without excluding other scientific and classical studies, and including Military Tactics—to teach such branches of learning as are related to agriculture and mechanic arts.

FOUNDATION AND HISTORY.

In obedience to the constitutional provision above quoted, an act for the establishment of a State Agricultural School was adopted by the Legislature of Michigan in 1855, and approved February 12 of that year, and the organization of the institution given into the charge of the State Board of Education.

A farm, then in the woods, of 676 acres, lying three and one-half miles east of the city of Lansing, was purchased and buildings erected, and on the 13th day of May, 1857, the College was formally opened for the reception of students. It is thus the oldest College of its kind in the country.

In 1861 an act of reorganization created the State Board of Agriculture, and placed the College under its control. This act, with but few subsequent modifications, constitutes the present organic law of the College.

The institution began with sixty-one students and five professors, these numbers being changed the next year to ninety-eight students and four professors.

The first graduates, seven in number, left the College in 1861. Since that time 547 more have graduated, including thirty-four of the class of 1891, a total of 553 to date.

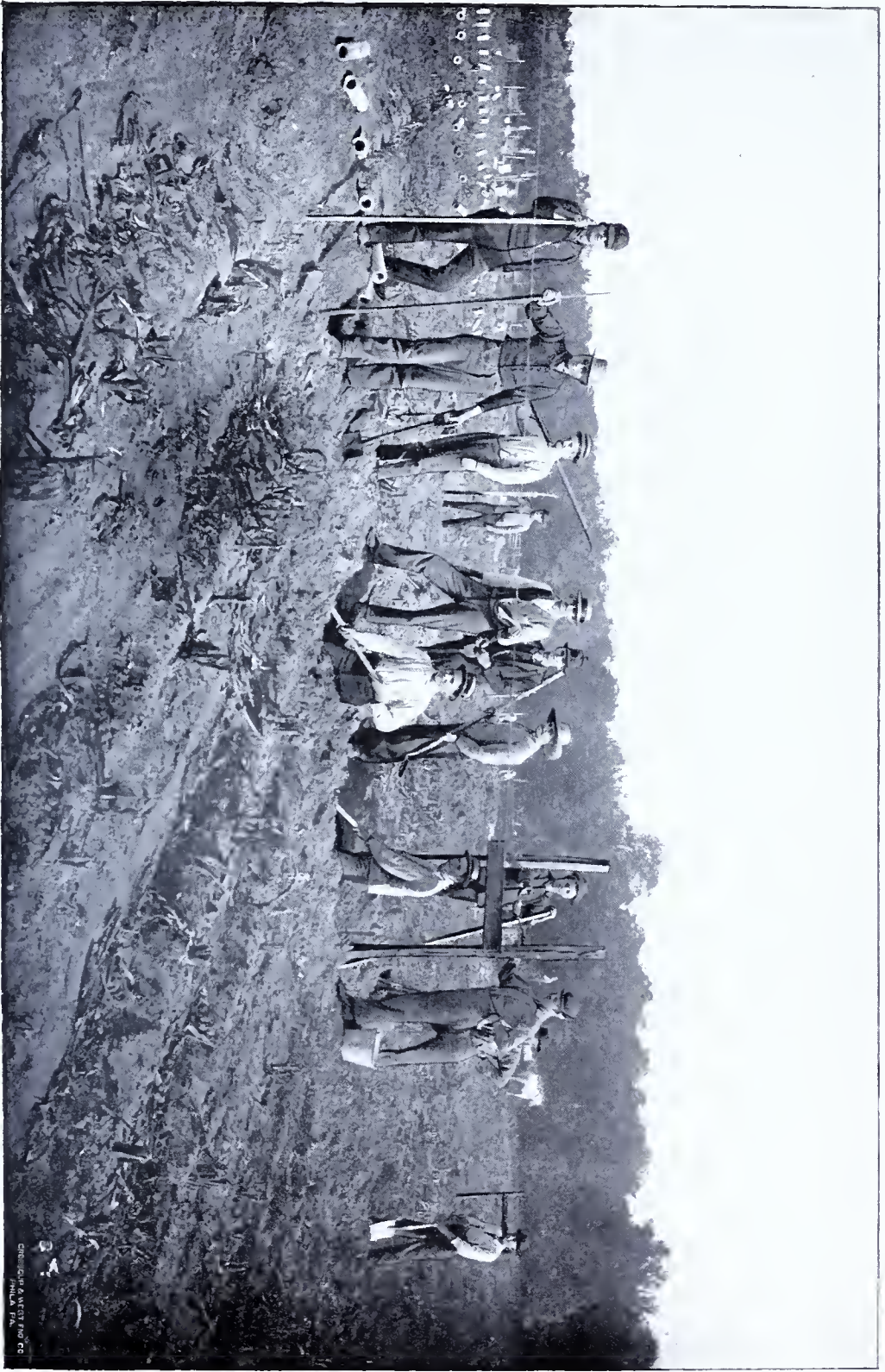
The appropriations of the Legislature of '87 have enabled the College materially to enlarge its facilities in the direction of horticultural science and art and in the mechanic arts. These facilities will be described in detail under their special titles in a subsequent part of the catalogue.

SCIENTIFIC AGRICULTURE.

In harmony with the purpose of its founders, the College endeavors to impart a knowledge of the natural sciences and their application to the arts of life. Those sciences, especially, which relate to agriculture and kindred arts, such as Chemistry, Botany, Horticulture, Zoölogy, Veterinary Science, and Physiology, are studied with constant reference to their practical applications in industrial life. The instruction given in the lecture-room is illustrated and enforced by the study of plants and animals, and the various studies and experiments of the farm and garden. Students are taught to distinguish clearly between those principles and settled rules of agriculture in accordance with which they may safely proceed, and those theories and practices which are either exploded and discredited or are as yet the proper objects of experiment and discussion only.

MANUAL LABOR.

The College affords to its students the benefits of daily manual labor. Most of the labor is paid for, and lessens the expenses of the student. It is in part educational—varied for the illustration of the principles of science. The preservation of health and the cultivation of a taste for agricultural pursuits are two other important objects.



GEORGE A. MERTON CO.
PHILA. PA.

LAYING TILE.

Four years of study without labor, wholly removed from sympathy with the laboring world, during the period of life when habits and tastes are rapidly formed, will almost inevitably produce disinclination, if not inability, to perform the work and duties of the farm. To accomplish the objects of the institution, it is evident that the student must not, in acquiring a scientific education, lose either the ability or the disposition to labor on a farm. If the farmers, then, are to be educated, they must be educated on the farm itself; and it is due to this large class of our population that facilities for improvement, second to none other in the State, be afforded them.

It is believed that the two and one-half hours' work that every student is required to perform on the farm or in the garden, besides serving to render him familiar with the use of implements and the principles of agriculture, is sufficient also to preserve habits of manual labor, and to foster a taste for agricultural pursuits. The daily labor of each one, being performed at one time, does not occupy him longer than is requisite for preserving health and a robust constitution.

RULES GOVERNING STUDENT LABOR.

The following rules for the government of students pursuing the Agricultural Course were adopted by the State Board of Agriculture April 6, 1892:

1. All students shall be required to engage in such manual labor as can be furnished, for two and one-half hours during five days of each week, except for the first six weeks of the spring term. Students not otherwise assigned by the catalogue for the first half of the spring term, must arrange for farm, garden, or special labor.

2. Students may be given the opportunity of electing special work, in which the individual responsibility of each is enlisted, and such students as may elect, and are, in the judgment of the heads of departments, capable of satisfactorily performing the work, may be assigned special lines of experiments.

3. The work for the three upper classes, so far as the seasons and crops will permit, is to be such as will best serve for the education of the students in the details of farm and garden work.

4. The members of the Junior and Sophomore classes may be assigned during the regular work hours for laboratory work (to be performed

under an instructor), such as studying the characteristics of the various animals and economic plants, methods of caring for them, etc.

5. Only such labor as is of value to the department shall be paid for. Other labor, such as pedigree work, library reading, studying of varieties, specimens, etc., that is purely educational in its nature, shall not be paid for.

All students in the Course of Mechanic Arts are required to labor eight to ten hours per week in the shops. As this labor is educational it is not paid for.

EXPERIMENTAL WORK.

A third feature of the work of the institution is the prosecution of experiments for the promotion of agriculture and horticulture. These arts are the creatures of experiment. Very few farmers possess facilities for carrying on experiments accurately and to definite results. From a lack of acquaintance with the laws of Nature, experiments generally, unless guided by scientific men, are comparatively valueless for the determination of vexed questions of practice and the establishment of general principles. Extensive laboratories in the different departments enable the institution to enter on a series of experiments to be prosecuted systematically and continuously from year to year. The results of these experiments are published in the monthly bulletins and in the annual report of the State Board of Agriculture.

GENERAL EDUCATION.

The professional part of the course gives a student an insight into the nature of the objects and forces with which he has to deal. Added to this are the branches of study which help to make him an intelligent and useful citizen, which cultivate his taste, and enable him to give expression to his knowledge and opinions.

REQUIREMENTS FOR ADMISSION.

ENTRANCE EXAMINATIONS.

Examinations are held at the beginning of the autumn term of the academic year, but those who choose to do so may present themselves at the beginning of the spring term in February. Candidates for admission into the Freshman class must bring testimonials of good character, and must be not less than fifteen years of age.



MARCH 1906

HAY MAKING.

The examination embraces the following subjects: Arithmetic, Geography, Grammar, Reading, Spelling. Penmanship, and History of the United States. A knowledge of elementary Algebra is desirable, and the greater number of candidates have such knowledge. In preparing for the College course, especial attention should be given to Grammar. The requirements are not extensive, consisting, as they do, only of an ability to recognize easily the parts of speech, their inflections and the uses thereof, and the primary sentence analysis; yet a larger proportion of applicants for admission fail in this study than in any other.

A candidate who is over eighteen years of age may, at the beginning of the fall term, be conditionally admitted to the Freshman class without examination.

After 1892 all students desiring to take the Mechanical Course, will be required to pass as part of the entrance examination, an examination in Algebra as far as Quadratic Equations.

ADMISSION ON CERTIFICATE OF GRADED SCHOOLS.

The graduates of graded schools having a regular course of study approved by the faculty, are admitted without further examination upon the presentation of proper certificates of graduation. Details as to the methods by which schools may enter upon this relation to the College will be furnished on application to the secretary of the Board of Agriculture.

ADMISSION ON TEACHERS' CERTIFICATE.

Any person presenting a teachers' certificate is admitted without further examination.

PREPARATORY CLASS.

Some of the applicants for admission to the Freshman class are deficient in knowledge of Arithmetic and Grammar, hence it has been determined to give a course of one term of preparatory study. This term will be the first, or fall term of the year. Students of this class who are preparing for the Agricultural Course will study Arithmetic, Grammar and History. Those preparing for the Mechanical Course will study Arithmetic, Grammar, Mechanical Drawing and Wood Shop Practice. Those who pass the examination in these at the close of the

fall term will then be expected to attend some public school during the winter and return to College at the close of the winter vacation, prepared to pass an examination in the Algebra and advanced English Grammar, which were taken by the Freshman class in the fall term, and so to be prepared to take up the work of the spring term with this class.

ADMISSION TO ADVANCED STANDING.

Those entering the Freshman class of the Agricultural Course at the beginning of the spring term must, in addition to an examination in preparatory studies, sustain also an examination in Algebra to equations of the second degree, including the theory of radicals; and in Grammar upon an equivalent to the first hundred pages of Meiklejohn's English Language; and in Ancient and Mediæval History upon an equivalent to the first four sections of Swinton's Outlines. A student deficient in a single subject (except Mathematics) may, however be received upon condition that he be prepared for examination at some future definite time.

Candidates for admission to the Course in Mechanic Arts, offering themselves at the beginning of the spring term, must comply with all the above requirements, except that instead of Ancient and Mediæval History, they must sustain an examination in one term's work in Mechanical Drawing and Wood Shop Practice.

Candidates for admission into any more advanced class must sustain an examination in all the previous studies of the course.

ADMISSION FROM OTHER COLLEGES.

Students from other colleges must show a certificate of honorable dismissal or of honorable standing. They will receive credit for studies pursued in any college authorized to confer degrees (so far as the two courses are equivalent), upon presenting a certificate of standing from the proper officer.

SELECT COURSES.

Persons of suitable age and acquirements, who desire to pursue one or more of the branches of study more closely relating to agriculture, or the mechanic arts (such as Chemistry, Botany, Animal Physiology,

Agriculture, Horticulture. Natural Philosophy, Veterinary Science, Draughting, Shop Practice), may be received for a shorter time than is requisite for the full course. By reference to the schemes of recitations, any person desiring select studies can ascertain whether the classes are so arranged as to permit him to pursue them.

Candidates for admission to a select course must sustain the examination required for entering the Freshman class, and give satisfactory evidence of sufficient knowledge and mental discipline to pursue successfully the studies selected.

Students are admitted at any time on passing the required examination, provided they are able to enter the classes already organized and somewhat advanced in the studies of the term; but it is greatly preferred that all candidates present themselves for examination on the first day of a term, or on the day named in the calendar.

GRADUATE STUDENTS.

Graduates of the College may remain for advanced study in any department, with no fees beyond incidental expenses. The number of graduate students is increasing with each year. The more complete training they thus acquire brings to them in many cases appointments to positions of influence and honor. Graduates from other colleges, or from the State Normal School, are received for post-graduate work without the payment of matriculation fee, and, if residents of Michigan, at no cost for tuition. Residents of other states pay \$5 per term of twelve weeks for tuition. The extensive laboratories in nearly every department give unusual facilities for post-graduate work.

SUMMER SCHOOL.

For several years, teachers and others who desire a few weeks of special training have appreciated the great advantages offered by the Agricultural College as a summer school, and have given hearty testimony to the value of the training they have received here. In recent years the number of these students has largely increased. To such students in the future the College will offer every facility in its power. In Chemistry, Physics, Botany, Zoölogy, Entomology, Horticulture, Farming, Veterinary Science, Mathematics, Civil Engineering, English Literature, German or French, and Manual Training in the wood and

iron shops, students will find unsurpassed facilities. All educated people, on first visiting the College, express surprise at the number and excellent equipment of its laboratories. All its equipment is open to the teachers of Michigan and to other competent persons for summer work, free of cost, except the matriculation fee of five dollars and the small expense for material consumed by them in laboratory work. The extensive and beautiful college grounds, with wide lawns, many groves, walks, drives, and attractive buildings, make a most desirable place for a few weeks of that valuable recreation that comes by change of work, and by absorption in a fascinating study.

The laboratory work is mainly individual, hence summer students can enter for this when convenient, work as many hours per day as they choose, and leave when they are ready. To join the regular College classes, the summer students are expected to have the training that fits them for pursuing the work. About the first of July special classes will be organized in Chemistry, Botany and some other studies.

TERMS AND VACATIONS.

The academic year is divided into three terms, which are arranged so that students are in attendance during almost the entire period of agricultural operations. There is a recess of one week in May following the spring term; and another of one week following the annual commencement, which occurs at or about the middle of August. The autumn term, the first of the academic year, ends at the third week in November. It is followed by a vacation of fourteen weeks, so that students are enabled to teach winter schools and thus defray a considerable part of their expenses.

ENROLLMENT IN CLASSES.

Before any student is enrolled as a member of a class he must present to the instructor a card of admission certifying that he has paid his term fees to the secretary and has been assigned by the president of the College to that study.

ELECTIVE STUDIES.

The Agricultural Course offers in each term of the Senior year the equivalent of five full-term studies. Candidates for a degree will be

required to take each term three full-term studies, or an equivalent, but more than this cannot be taken without the especial permission of the Faculty.

SCHOLARSHIP AND ATTENDANCE.

EXAMINATIONS.—A careful record of scholarship is preserved by marks on a scale from 0 to 10. A written examination follows the completion of each study, and each student is recorded *passed* when the sum of his class standing and examination marks equals or exceeds 14. Any student present at less than four-fifths of the class exercises in any study is required to pass a more extensive examination, with a standing of at least 7. Any student may, with the consent of the Faculty, receive a special examination in any study, and pass upon a standing of 7; but before each special examination a fee of fifty cents is required.

No student failing in two studies is allowed to continue in his class, nor is he allowed to take special studies in advance of his class except by special vote of the Faculty, until all such failures are made up.

REGULARITY OF ATTENDANCE.—On entering College the student places himself under the direction of the Faculty. He is not at liberty to leave College during any portion of the term to teach school, engage in manual labor, or for other reasons, without first getting permission of the Faculty.

The fact that the instruction is given largely by lectures, laboratory practice, and the manual labor system, makes the presence of students at the College throughout the entire year of great importance, and leave of absence is allowed only upon urgent necessity. No student will be excused to earn money in the harvest season.

FEES AND EXPENSES.

MATRICULATION AND GRADUATION.—Every undergraduate student upon entering the College is required to pay a matriculation fee of \$5. This is paid but once, and entitles the student to the privileges of permanent membership in the College. No charge is made for tuition, except for residents of other states, who, under an act of the State Legislature and a resolution of the Board, are charged a fee of \$5 a term. The graduation fee is \$5.

LABORATORY EXPENSES.—Students in Chemistry pay 75 cents at the beginning of the Sophomore summer term for manipulations, \$1 at the beginning of the Junior fall term for volumetric analysis, \$10 at the

beginning of the Junior spring term for qualitative analysis, and \$5 at the beginning of the Senior summer term for quantitative analysis.

Students in Zoölogy are charged \$1.50, and students in Physiology and Veterinary Science are charged 50 cents each for materials used in laboratory work.

ROOM RENT AND INCIDENTALS.—Students will occupy rooms in the dormitories, unless other arrangements are permitted by the Faculty. The rent of rooms, in which is included the expense of steam heating and of pumping water to the several halls, varies according to the desirableness of the rooms and as they are occupied by one or two persons. The highest and the lowest charges per term are:

	LOWEST.	HIGHEST.
Rooms with single occupant.....	\$3 00	\$7 00
Rooms with two occupants.....	6 00	14 00

The rooms are unfurnished, and the College has no furniture or bedding that can be rented.

The term fee for incidentals is \$2.50, in which is included the expense of sweeping and lighting the corridors and of repairing and cleaning the dormitories.

These charges are payable at the beginning of each term.

BOARDING CLUBS.—There are five separate kitchens and dining halls, so that the students are divided into five boarding clubs. The business management of each club is in the hands of a steward elected by the members of the club. A committee of the Faculty is charged with the duty of a general oversight of the system. Students can be assigned temporarily to any club by the president of the College. An advance payment of \$20 at the beginning of a term will be required in order that staple groceries may be purchased in large quantities. Students are required to pay for board at its estimated cost at least one week in advance. The average cost of board has been about \$2.50 per week.

All bills must be paid promptly when due, and no student will receive an honorable dismissal or diploma until his accounts with the secretary and the boarding clubs are settled.

The following tabular statement of expenses is added for the purpose of enabling a young man who thinks of attending the College to estimate more closely the probable cost of residence:



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FEES AND EXPENSES.

33

A TABLE SHOWING THE AVERAGE ANNUAL EXPENSES OF ATTENDANCE AT
THE AGRICULTURAL COLLEGE.

[This table is computed for one year by dividing the total expenses of the four years' course by four. The different years vary slightly.]			
	Lowest possible cost.	Highest possible cost.	Probable cost to the average student.
Board for 36 weeks. This varies in the different clubs from \$2.30 per week to \$2.70 per week	\$82 80	\$97 20	\$90 00
Room rent, heating, and water. This varies with the room and the number of occupants (1 or 2). The number of rooms at the lowest rate is quite limited..	9 00	21 00	14 25
Incidental expenses, including sweeping and lighting the corridors, and repairing and cleaning the dormitories	7 50	7 50	7 50
Text-books, drawing instruments, etc.....	10 00	18 00	12 00
Laboratory fees during four years, \$19.25.....	3 06	4 81	4 50
Matriculation—Charge on entering the course, \$5	1 25	1 25	1 25
Diploma on graduating, \$5.....	1 25	1 25	1 25
Total.....	\$114 86	\$151 01	\$130 75
Deduct wages received for labor. This may range as follows:			
In case of physical inability to labor		0 00	-----
In case the student performs only required labor.....			18 00
In case the student works eight hours Saturdays and four hours other week days.....	80 64	-----	-----
Total College expenses	\$34 22	\$151 01	\$112 75
With this the following must be remembered:			
Cost of furnishing room, average for each of four years	2 00	10 00	5 00
Clothing per year.....	30 00	100 00	50 00
Traveling expenses.....		100 00	20 00
Vacation board, 16 weeks.....	32 00	80 00	48 00
Sundry personal expenses.....	30 00	200 00	50 00
	\$128 22	\$641 01	\$285 75
Deduct vacation earnings.....	128 22	-----	85 75
Net cost per year	-----	\$641 01	\$200 00

From the above figures it will be possible for each one to make a tolerably accurate estimate of what his own expenses will be. The figures of the first column will be realized only by young men of

especial energy, ability, and self-denial. The aggregate of the second column need be exceeded by no one who is not unwisely extravagant, while the figures of the third column are entirely possible to any prudent student and will be found in general the safest guide as to what may be expected.

The following *advance payments* will be required of each new student on arrival:

	Lowest.	Highest.
Matriculation fee, to be paid but once for the whole course.....	\$5 00	\$5 00
Advance payment on account of board.....	20 00	20 00
Fee for incidental expenses, advance for one term.....	2 50	2 50
Room rent, advance for one term.....	3 00	7 00
Deposit required on issuing key to room.....	1 00	1 00
Amount necessary to furnish room.....	5 00	25 00
Text-books and laboratory fees.....	3 50	14 50
Uniform.....	15 35	15 35
Total advance.....	\$55 35	\$90 35

In addition to this, students taking the Mechanical Course must purchase a complete set of drawing instruments, costing \$16.00.

UNIFORM.

Military drill is a feature of the College course, and by a recent vote of the State Board of Agriculture all students are required to appear in uniform at drill.

For the benefit of those who have already provided clothing for the fall and winter, this ruling of the Board will take effect at the beginning of the spring term, 1893.

Students are advised to come to the College without especially providing themselves with new clothes, and to arrange to wear the cadet uniform habitually while at College.

The cost of the uniform is \$15.35, including the cap. The suiting is of good quality and wears well.

DEGREES.

The degree of Bachelor of Science is conferred upon students who

complete either of the full courses and who sustain all the examinations in the same.

Opportunities for instruction and practice in post-graduate studies will be afforded the graduates of the College and of other similar institutions as follows:

The student, if a candidate for the degree of Master of Science, shall, with the approval of the Faculty, select from the prescribed subjects one major study and one minor—the latter preferably a modern language.

The following are the subjects which may be selected as majors:

Agriculture.	Mechanics, Physics, and Engineering.
Botany.	Political Economy.
Chemistry.	Veterinary Science.
Horticulture.	Zoölogy

The candidate, if he gives his entire time to the study, shall, before being recommended for the degree, spend at least the equal of one academic year at this College in the pursuit of his studies, pass a satisfactory examination in the same, and present an acceptable thesis upon some subject approved by the Faculty.

If the candidate is not able to give his entire time to advanced work, or is not able to pursue his entire course of study at the College, the work done must be sufficient, in the opinion of the Faculty, fairly to represent the equivalent of one year at the College entirely devoted to advanced work as specified in the preceding paragraph.

The student, if a candidate for the degree of Mechanical Engineer, must be a graduate in the Mechanical Course of this institution, or other institution giving a similar course.

The prescribed course of study will involve Mechanical Engineering as a major, with one of the following subjects as a minor, viz:

- Mathematics.
- Modern Languages.
- Physics.

The further requirements as regards the time necessary, examinations, theses, etc., are similar to those prescribed for the degree of M. S.

COURSES OF INSTRUCTION.

AGRICULTURAL COURSE.

[Numerals denote the number of hours per week.]

FRESHMAN YEAR.

AUTUMN TERM.—*Algebra*—Bowser's, 5. *Ancient History*—Meyers', 5. *English*—Meiklejohn's Grammar, 5. *Rhetoricals*, 2.

SPRING TERM.—*Algebra*, 5. *Agriculture*—Lectures, 5. *Drawing*—Free-hand, 10. *Rhetoricals*, 2.

SUMMER TERM.—*Geometry*—Bowser's, 5. *Botany*—Gray's Lessons and Manual, 5. *Rhetoric*—Williams', 5.

SOPHOMORE YEAR.

AUTUMN TERM.—*Geometry*, 5. *Psychology*, 4. *Landscape Gardening*—Lectures, Long's Gardening, the first 7 weeks, 5. *Botany*—Lectures, last half term, 5. *Rhetoricals*, 2.

SPRING TERM.—*Botany*—Laboratory work, 10. *Rhetoric*—Genung's Practical, 5. *Agriculture*—Lectures, half term, 5. *Physics*—Atkinson's Ganot, 4. *Military Tactics*, 2.

SUMMER TERM.—*Elementary Chemistry*—Lectures, Bloxam, 5. *Chemistry*—Laboratory practice, 2. *Physics*—Atkinson's Ganot, 5. *Trigonometry*, 3. *Surveying*—Hodgman's, 2. *Field Work*—in Surveying, one afternoon per week. *Botany*—Laboratory work, 2. *Rhetoricals*, 2.

JUNIOR YEAR.

AUTUMN TERM.—*Anatomy*—Lectures, Martin, half term, 4, and Laboratory Practice, 2. *Organic Chemistry*—Lectures, 5. *Volumetric Analysis*, half term, 4. *Physics*, half term in 1892, 5. *Moral Philosophy*—Janet's Elem. of Morals, half term, 5. *American Literature*—

Richardson's Primer and selected texts, half term after 1892, 5. *Shakespeare*—Rolle, 1. *Essay. Public Oration.*

SPRING TERM.—*Analytical Chemistry*—Kedzie's Hand-book, 10. *Horticulture*—Lectures, Thomas and Henderson, Laboratory, 5. *Human and Comparative Physiology*—Lectures, Martin, 5, and Laboratory Practice, 15, for two weeks. *Shakespeare*, 1. *Physiological Essay. Public Oration.*

SUMMER TERM.—*Agriculture*—Lectures, 5. *Agricultural Chemistry*—Lectures, 5. *Entomology*—Lectures, Hyatt, Cook's Manual, 5, and Laboratory Practice, 2. *Shakespeare*, 1. *Essay in English Literature.*

SENIOR YEAR.

In the Agricultural course, Senior year, the studies have been arranged to follow each other largely in the order of dependence and the student will select at the beginning of the year his *line* of study, rather than the individual study of any term. These lines are arranged as follows, and are named by the accompanying number: [To be read horizontally.]

AUTUMN TERM.	SPRING TERM.	SUMMER TERM.
I. Botany.	Horticulture.	Agriculture.
II. Physics.	Meteorology.	Chemistry.
III. Zoölogy.	Geology.	Entomology.
IV. Veterinary Science.	Veterinary Science.	Veterinary Science.
V. Political Economy.	Agricultural Engineering.	U. S. History.

As will be seen, then, there are five lines or courses of study offered. Of these the student is required to take three, and he may take a fourth by and with the consent of the Faculty. The presumption is that when the student elects his courses or lines in the autumn, he intends to hold to those courses during the three terms of the year. If, however, at the beginning of any term there shall arise any just reason for a change from one course or line to another, and the student interested shall desire to make such change, he will submit his request, with reasons attached, to a standing committee of the Faculty, called the committee on courses. The decision as to the change will then rest with the committee.

Of all agricultural seniors there will be required, besides the three regular courses, one essay in English Literature and one oration in the Autumn term, one essay in Political Economy or History in the

Spring term, and one oration in the Summer term, together with one day per week of class-work on Milton. With these explanations, then, the tabulated statement of the Senior year will appear as follows:

[The Roman numerals indicate the course to which the studies belong; the Arabic numerals indicate the number of hours per week.]

AUTUMN TERM.—I, *Botany or Forestry*—Lectures or Laboratory practice, 10. II, *Physics*—Atkinson's Ganot, Laboratory practice, 10. III, *Zoölogy*—Lectures, Packard, 5, and Laboratory practice first ten weeks, 3. IV, *Veterinary Science*—Lectures first ten weeks, 5, Dissection last two weeks, 10. V, *Political Economy*, 5. *Critical essay* in English Literature. *Oration*.

SPRING TERM.—I, *Horticulture*—Lectures and Laboratory practice, 5. II, *Meteorology*—Lectures, 5. III, *Geology*—Lectures, Le Conte, 5. IV, *Veterinary Science*—Lectures and Clinical instruction, 5. Lectures, 5. V, *Agricultural Engineering*—Lectures, Johnson's Theory and Practice, 5. *Essay* in Political Economy.

SUMMER TERM.—I, *Agriculture*—Lectures, 5. II, *Chemistry (Quantitative Analysis)*—Laboratory practice, 10. III, *Entomology*, 5. IV, *Veterinary Science*—Lectures and Clinical instruction, 5. V, *United States History*—Johnston's American Politics, 5. *Milton*, 1. *Oration*.

MECHANICAL ENGINEERING COURSE.

[Numerals denote the number of hours per week.]

FRESHMAN YEAR.

AUTUMN TERM.—Algebra, 5. Drawing, 8. English, 5. Rhetoricals, 2. Shop work, 10.

SPRING TERM.—Algebra, 5. Geometry, 5. Free hand Drawing, 6. Elocution, 2. Physics, 4. Physical Laboratory, 2. Shop work, 8.

SUMMER TERM.—Geometry, 5. Descriptive Geometry, 5. Rhetoric, 5. Physics, 4. Physical Laboratory, 2. Shop work, 10.

SOPHOMORE YEAR.

AUTUMN TERM.—Trigonometry, 5. Work shop methods, 2. Descriptive Geometry, 6. Rhetoricals, 2. Physics, 4. Physical Laboratory, 2. Shop work, 12.

SPRING TERM.—Analytical Geometry, 5. Surveying, 2. Surveying (field work) 2. Drawing and Machine Design, 4. Rhetoric, 5. Shop work, 8. Tactics, 2.

SUMMER TERM.—Calculus. 5. Elements of Machine Design, 10. Steam Engine, 3. Shop work, 10. Rhetoricals, 2.

JUNIOR YEAR.

AUTUMN TERM.—Calculus, 5. Machine Design, 6. German, 5. Chemistry, 5. Chemical Laboratory, 2. Shop work, 6.

SPRING TERM.—Mechanics of Engineering, 5. Steam Boilers, 1. German, 5. Chemistry, 3. Chemical Laboratory, 2. Machine Design, 6. Shop work, 8.

SUMMER TERM.—Mechanics of Engineering, 5. Strength of Materials, 5. Testing Laboratory, $2\frac{1}{2}$. German, 5. Shop work, 10.

SENIOR YEAR.

AUTUMN TERM.—Graphical Statics, 3. Valve Gears, 2. Thermodynamics, 5. Steam Engine Design, 10. Shop work, 10. Oration.

SPRING TERM.—Hydraulic or Electrical Engineering, 5. Kinematics, 5. Advanced Designing, 10. Steam Engineering Laboratory, 6. Electrical or Hydraulic Laboratory, 4.

SUMMER TERM.—Civil Engineering, 5. Original Designs, 6. Lectures on Engineering Practice, 2. English Masterpieces, 5. Thesis work, 10. Oration.

DEPARTMENTS OF INSTRUCTION.

The order in which studies are pursued has been given above. Under the present title a somewhat detailed account will be given of the topics embraced in the several departments of instruction:

AGRICULTURE.

Instruction is given by lectures and by work in the laboratory, the tool-room, the barn, and the field, as follows:

Freshman Year.—Spring Term—Twelve weeks' course in the history, development, and characteristics of the domestic animals, their adaptability to various purposes and conditions, and their general care and management, illustrated and supplemented by work in the yards among the College stock, and in the laboratory with herd-books and breeders' catalogues.* Six weeks additional, 10 hours per week, will be spent in the carpenter shop.

Sophomore Year.—Six weeks of lectures are given in the Spring term on the soil—its nature and cultivation; the crops of the farm—their culture and management; relation of farm crops to each other, to the manures, and to different soils and localities; rotation of crops. These lectures are illustrated by examples from historical and comparative agriculture, and by study in the laboratory and practical work upon the farm.

For two weeks of the Spring term $12\frac{1}{2}$ hours a week are spent in the laboratory and tool-room studying the construction of farm machinery, its operation and care, together with practical work in sharpening and fitting for use the ordinary tools of the farm; two weeks in the blacksmith shop, and two weeks in the agricultural laboratory.

Junior Year.—Summer Term—Lecture course of twelve weeks in

* The class of '95 will take pedigree work in connection with other laboratory work Spring term, Sophomore year.

agricultural science, embracing the following topics: Principles and practice of breeding, so far as they apply to animal and plant life upon the farm—heredity, variation, selection, surroundings, habit, use and disuse, crossing, grading, pure breeding, inter-breeding, line-breeding, prepotency, fecundity, sterility, etc.

Stock-feeding—a study of foods and their relation to growth, to fat, to labor, to milk, and to the individual—the personal equation, and the relation between the animals and the crops of the farm.

Senior Year.—One term (elective) will be devoted to the consideration of specialties in farming, such as dairying, poultry-raising, etc., and to practice in agricultural debate.

For work in the farm department see Rules for Labor page 25.

ASTRONOMY.

For illustration in this subject, the College possesses a sextant, an altitude-azimuth instrument, and a five and one-half inch telescope made by Alvin Clark & Sons.

The telescope is mounted equatorially, and is furnished with driving clock and right ascension and declination circles. The calculations and reductions of observations necessary to determine latitude, longitude, local time, etc., receive considerable attention.

BOTANY.

I. STRUCTURAL.—This course occupies the twelve weeks of the Freshman Summer term, with exercises for five days in the week. As no real progress can be made till the pupils learn to observe correctly, they first strive to acquire this habit by continued trials. Every one begins and continues for some time to study the specimens with only occasional hints from the teacher and a few references to Gray's Lessons. The plants, or parts of plants, selected for these exercises are mostly suggested by the subject treated in the text-book. Considerable stress is placed on morphology and the study of the more difficult subjects, such as the kinds of ovules, seeds, and fruits.

Besides these, a limited time is given to the agency of insects in fertilization, contrivances for repelling unwelcome guests, motions of plants, etc. Each student provides himself with a stage microscope for constant use, and writes a thesis embodying the results of original

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observations and experiments. The review for the last part of the term consists largely of a study of the book named above as far as lesson twenty-eight.

II. SYSTEMATIC.—Half of the Sophomore Autumn term and one afternoon per week of the Summer term is devoted to the subject of classification of flowering plants, their nomenclature, description and synonyms, and the collecting, naming, and preserving of specimens. The time is divided between listening to short lectures and the study of specimens of several of the more important or difficult families, especially those containing trees, weeds and grasses.

III. PHYSIOLOGICAL.—During two hours a day for four days in the week throughout the Spring term, the Sophomores are occupied in the laboratory, each using a compound microscope, preparing his own slides, making notes, drawings, and employing reagents.

Once a week lectures are given on the structure, use, care and mode of selecting a microscope; also on the anatomy and physiology of plants. The time is chiefly devoted to the study of the higher plants. Considerable use is made of Strausburger's Hand-book, Bessey's Text-book, and Goodale's Physiological Botany.

IV. CRYPTOGAMIC.—This is elective for five days in the week during the Autumn term of the Senior year, and consists mainly of laboratory work on the lower plants aided by the compound microscope, and by lectures one day in the week. The course varies somewhat in accordance with the wishes of the students.

V. GRASSES AND CLOVERS.—Instead of the preceding course, the Seniors may elect the botanical study of our forage plants, giving some attention to other plants belonging to the same families, though considerable attention is given to parasitic fungi.

VI. FORESTRY.—In place of either of the two preceding courses, the Seniors may elect to devote the term to the elements of forestry.

CHEMISTRY.

ELEMENTARY CHEMISTRY.—The study of this science is entered upon in the second year. There is given a course of lectures, illustrated by appropriate experiments, embracing the history of chemistry, chemical affinity, and laws of chemical combination; elementary substances—their history, geographical distribution, preparations, properties, combinations, and technical uses and the applications of chemistry in the

arts and manufactures. A short course in chemical manipulation is given, which renders the student familiar with manipulation in the gases.

ORGANIC CHEMISTRY.—In the following term a course of lectures on Organic Chemistry is given.

VOLUMETRIC ANALYSIS.—A short course of lectures is given, explaining the principles and methods by which quantitative analysis by volume is performed. The students then make a volumetric analysis of a large number of commercial products, especial attention being devoted to practical applications in alkalimetry and acidimetry.

QUALITATIVE ANALYSIS.—In the second term the members of the Junior class spend two hours a day in the laboratory, under the direction and supervision of the professor of Chemistry and his assistants, applying with their own hands the reagents required to determine the composition and properties of bodies, thus securing a practical knowledge of the methods employed in such investigations. Each student is required to make an analysis of at least fifty substances, embracing commercial and natural productions, manures, ashes of plants, technical minerals, soils, etc.

QUANTITATIVE ANALYSIS.—In the third term of the Senior year Quantitative Analysis is an elective study, the students spending two hours a day in this work. The course in Quantitative Analysis includes a course in Assaying. For this purpose four assay furnaces, one gold and silver furnace (Orr & Hess), and assay and silver balances have been provided.

AGRICULTURAL CHEMISTRY.—The instruction in Agricultural Chemistry is imparted by lectures, which cover the following topics: formation and composition of soils; the relations of air and moisture to vegetable growth; connection of heat, light and electricity with growth of plants; nature and source of food of plants; chemical changes attending vegetable growth; chemistry of the various processes of the farm, as plowing, fallowing, draining etc.; preparation, preservation, and composting of manure; artificial manure; methods of improving soils by chemical means, by mineral manures, by vegetable manures, by animal manures, by indirect methods; rotation of crops; chemical composition of the various crops; chemistry of stock feeding and chemistry of the dairy.



INTERIOR OF CHEMICAL LABORATORY.

CHEMICAL LABORATORY
CHICAGO, ILL.

DRAWING, FREE-HAND.

The importance of drawing as an aid in scientific study and investigation is fully recognized, and at an early stage of the course the Agricultural students are assigned to the teacher of free-hand drawing for work in the studio for two hours per day for one term (120 hours). [For free-hand drawing in Mechanical course see Mechanical Engineering.]

The design is to train the eye to see correctly, and the hand to obey the mandate of the will in representing accurately what the eye sees. The work begins at once by drawing from objects, flat copies being used chiefly as illustrations of how objects may be represented.

The facilities for work are good and increasing. Studies in black and white and oil and water colors are at the service of the student, and it is designed to add a series of fine photographs illustrative of the history of sculpture, architecture and painting. Good casts, geometric models, both skeleton and solid, and plants from the conservatories are at hand. Desks of the best kind are used, giving each student control of his model and enabling him to light it at pleasure.

Drawing is extensively used in the study of Botany, Anatomy, Zoölogy, Entomology, and Veterinary Science. Though the work is planned chiefly with a view to the use of the drawing in the studies of the course, the instructor is pleased to aid those who may choose to elect special work, and give it a more artistic bent.

ENGINEERING—CIVIL.

Under this title are included (I) Surveying and Leveling, (II) Engineering, (III) Hydraulics, (IV) Graphics.

1. SURVEYING AND LEVELING.—This study with Trigonometry extends through one term in the Sophomore year, and with Agricultural Engineering through one term in the Senior year. It is principally devoted to practice with instruments and the necessary calculations to reduce such work. Approved methods are taught in the class-room, and the students are required to take the necessary instruments and perfect themselves by practice. The study in the Sophomore year is principally devoted to work with the compass, chain and level; in the Senior year to practice with transit, sextant, and theodolite. Neat drawings of surveys are called for.

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The College is well supplied with instruments for practice, owning three compasses, three Y levels, three transits, one solar transit, one sextant, one theodolite, and a number of rods, chains and steel tapes.

II. AGRICULTURAL ENGINEERING.—This study embraces principally Higher Surveying and a few of its applications. The divisions of the subject are Land and City Surveying, Topographical Surveying, Location and Construction of Highways, and Systems of Drainage.

III. HYDRAULICS.—This subject is studied as a branch of the Mechanics of Engineering. It is elective for Seniors taking the Mechanical course.

IV. GRAPHICS OF FRAMED STRUCTURES.—This is a short course for Mechanical students. It deals with the stresses in the simpler forms of roof-trusses and bridges, the graphical method being used.

ENGINEERING—MECHANICAL.

The object of this course is to give the student a thorough training in the theoretical branches underlying the science of machines and practical mechanics, and at the same time to enable him to become familiar with the numerous applications of principles which have become of such inestimable value to the human race.

Under this head are included the following subjects:

English.—See synopsis, page 48.

Mathematics.—See synopsis, page 53.

Physics.—See synopsis, page 51.

Chemistry.—See synopsis, page 43.

STEAM ENGINE.—This study is taken up during the third term of the Sophomore year. It is intended to make the student familiar with names and uses of the different parts of the steam engine as well as to study the different forms seen in the most common engines. Three days per week.

STEAM BOILERS.—During the second term, Junior year, this subject is pursued, paying particular attention to materials used in construction, adaptation of different types for different places and purposes, approved forms of setting, and economical methods of management. One day per week.

STRENGTH OF MATERIALS.—This work is divided into recitations and laboratory work. It extends through the third term, Junior year. In the testing-room metals of all descriptions, wood, stone, brick, cements,



THE DRAWING ROOM.

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DEPARTMENTS OF INSTRUCTION.

etc., are tested and reports made as required in actual practice. A text-book is used (Church) in the class room and prepared blanks in the testing room. Five days per week, $2\frac{1}{2}$ hours testing room.

THERMODYNAMICS.—The fundamental principles underlying the transformation of heat into work, more especially as exemplified in the steam engine, are carefully studied. Recitations, five days per week.

VALVE GEARS.—Recitations and drawing room work are required in this subject. The application of the Zeuner diagram, as an aid in the study and design of valves for all engines is carefully brought out. The various kinds of valves, linkages, valve gears and cut-offs are investigated largely by reference to trade catalogues. Two days per week.

KINEMATICS.—A study of the nature and equivalence of Mechanisms. Determinations of Centroids. Graphical diagrams of the paths, speeds and accelerations of important points in familiar mechanisms. Laying out of cams, five days per week.

STEAM ENGINEERING LABORATORY.—Use of the indicator and various reducing motions. Calibration of instruments such as scales, gauges, indicator springs, etc. Experiments with the various calorimeters. Boiler Testing and Duty Trials. In addition to this a limited amount of commercial testing of steam specialties is undertaken. In all this work particular attention is paid to carefully prepared reports, which are always required.

DRAWING AND DESIGNING.

FRESHMAN YEAR.

FIRST TERM.—Use and care of instruments, Geometrical and Projection drawing, Lettering, Drawing from parts of machines, tools, etc.

SECOND TERM.—Free-hand drawing of parts of machines, Free-hand Isometric drawing, sketches from machines, time sketches and memory sketches.

THIRD TERM.—Elementary Descriptive Geometry. Text-book work and drawing.

SOPHOMORE YEAR.

FIRST TERM.—Descriptive Geometry continued.—Problems applied.

SECOND TERM.—Drawing and Elements of Machine Design. Tracings and blue prints. General views from given details.

THIRD TERM.—Elements of Machine Design. Proportioning of such machine parts as come under the head of fastenings, as keys for pulleys, cranks, etc., connecting rod ends. Methods of drawing curves of teeth, spur gearing, bevel gearing, worm gearing.

JUNIOR YEAR.

FIRST TERM.—Machine Design continued. Pulleys and stepped cones, cone pulley diagrams, rotating pieces, bearings for rotating pieces.

SECOND TERM.—Machine Design continued. Pistons, piston rods, cross-heads and connecting rods.

THIRD TERM.—No drawing.

SENIOR YEAR.

FIRST TERM.—Steam Engine Design. Calculations and working drawings of a high speed steam engine.

SECOND TERM.—Advanced Designing. Calculations and working drawings for hoisting, pumping and metal working machines.

THIRD TERM.—Advanced Designing. Original designs.

The student in Mechanical Drawing will need a draughting board 20 by 25 inches, T square, one eight inch triangle with angles 90° , 45° and 45° , one twelve inch triangle with angles 90° , 60° and 30° , a few first-class German silver draughting instruments, among which should be one drawing pen, one bow pen and pencil, one pair five-inch compasses, with pen, pencil and needle points, one irregular curve, and one flat scale divided into sixteenths. The student is recommended to postpone the purchase of instruments until arrival at the College.

THESIS WORK.—This work is intended to be of the nature of original research and as far as possible must be without aid from instructors. A written report of all work done is required, accompanied by drawings when necessary. All theses are to be handed in by the middle of July, and when accepted they are to be written upon a uniform size of paper, bound, and left at the College with the Department for future reference.

ENGLISH LANGUAGE AND LITERATURE.

ENGLISH GRAMMAR.—This study is pursued during the first term of the Freshman year. It is mainly a study of the English sentence, including punctuation, supplemented by elementary lessons in etymology.



IN THE LIBRARY.

The practical ends aimed at are, the use of correct and forcible English in writing and speaking, and the training of the critical and analytical faculties.

RHETORIC.—The study of Rhetoric occupies two terms. The Freshmen spend one term in the study of style and such elementary principles of invention as are necessary for their guidance in the writing of numerous exercises, principally narrative and descriptive. The Sophomores study invention, including the kinds of composition and the selection and arrangement of material. The written work of this term is principally in exposition, argumentation, and persuasion.

ENGLISH AND AMERICAN LITERATURE.—During the first term of the Junior year the Agricultural students have a half-term upon American Literature. The course will embrace a consideration of the history of American Literature, sketches of the life and work of leading American authors, and the critical study of a few of the masterpieces that adorn our literature.

During the third term of the Senior year, Mechanical students will have a term's work on English Literature. The time will be devoted to the critical study of a half-dozen masterpieces, illustrating different periods of English Literature. The object of the course is to educate the taste, cultivate a habit of thorough and critical reading, and secure an intelligent notion of the relation of literature to the social and political history of the period in which it was produced.

A course of reading in Milton occupies the Agricultural students of the Senior class one day a week during the third term.

RHETORICAL EXERCISES.—The following scheme indicates the character of the rhetorical work for the whole course:

FRESHMAN YEAR—Both Courses.

AUTUMN TERM.—Semi-weekly exercises in expressive reading: work based on some selection from standard prose, as Irving's "Legend of Sleepy Hollow." Exercises in word-study. Two selected readings.

SPRING TERM.—Work as in previous term, with the addition of the study of gesturing. Study of synonyms, antonyms, and common errors in the use of words. Two declamations.

SUMMER TERM.—Essays in connection with the work in Rhetoric.

SOPHOMORE YEAR—*Both Courses.*

AUTUMN TERM.—Study of words continued, together with practice in rhetorical analysis, founded on selections from Webster or Macaulay. Extemporaneous speeches. Essay and declamation.

SPRING TERM.—Essays in Rhetoric class.

SUMMER TERM.—Study of oratorical masterpieces. Selections from Burke. Extemporaneous speeches. One oration.

JUNIOR YEAR—*Agricultural Course.*

AUTUMN TERM.—One hour per week in the study of Shakespeare. Essay on assigned subject in American Literature. Oration.

SPRING TERM.—Shakespeare as before. Essay on an assigned subject in Physiology. Oration.

SUMMER TERM.—Shakespeare as before. Essay on an assigned subject in Horticulture.

Mechanical Course.

Written work in French or German throughout the year as a substitute for essays. Orations as for the the Agricultural Course.

SENIOR YEAR—*Agricultural Course.*

AUTUMN TERM.—Essay on an assigned subject in American Literature. Oration.

SPRING TERM.—Essay on an assigned subject in Political Economy.

SUMMER TERM.—Weekly readings in Milton. Oration.

Mechanical Course.

Technical essays throughout the year. Orations as for Agricultural Course.

NOTE.—The orations of the Junior and Senior years are delivered before the whole body of students, in the chapel, immediately after prayers. Each student presents two orations during his Junior year, and two during his Senior year.

FARMERS' INSTITUTES.

For several years Institutes have been held under the auspices of the State Board of Agriculture. The times and places are determined by the Board at the November meeting. Several members of the Faculty are delegated to attend each institute, and the chairman of each com-

mittee coöperates with the local committee in making all necessary arrangements. The exercises consist of lectures, essays, and discussions upon leading topics in agriculture, and are sustained by the joint effort of the people of the places where the Institutes are held and members of the Board, or of the Faculty of the College. A series of Institutes will be held during the months of January and February, 1893, in various parts of the State.

GEOLOGY.

Instruction is given in Lithology, Historic Geology, and the causes which have wrought and are now working the various geologic changes. Special attention is given to the geology of Michigan. The course is given by lectures and illustrated by maps, diagrams, the various rocks, fossiliferous and non-fossiliferous, and the large collection of casts to be found in the geological cabinet. To gain a better knowledge of rock structure,—stratigraphy, joints, dip, etc.,—the students with the professor, visit, at some time during the period of instruction, the outcrops at Grand Ledge, on Grand River.

GERMAN OR FRENCH.

German or French will be offered during the entire Junior year to students in the course in Mechanic Arts. The instruction in both languages will be directed especially toward facility in reading scientific literature.

HISTORY AND POLITICAL SCIENCE.

ANCIENT HISTORY.—This study is required in the Agricultural Course, and is given in the first term of the Freshman year. The leading nations of antiquity will be studied with especial reference to their institutions. Myers's "General History" will be used as a text-book, and it will be supplemented by library references and familiar lectures.

POLITICAL ECONOMY.—This subject is taught in the fall term of the Senior year. Owing to the recent greatly improved facilities in the library, the instruction will be mainly by the topical method. Walker's or some good text-book will be selected for the basis of the first part of the work, and later on lectures will be given upon the leading economic questions of the day.

Questions of public revenue, government expenditure, the principles and practice of national and local taxation and the economic consequences of public debts will also be considered.

HISTORY OF THE UNITED STATES.—The summer term of the Senior year, will be devoted to a study of the constitution and history of the people of the United States. Johnson's American Politics and Fiske's Civil Government will be used as a basis for the course. Particular attention will be given to the industrial development of the nation and its financial experiences. The great public questions of our history will be carefully investigated. The topical method will be quite largely used.

HORTICULTURE.

The course in horticulture includes four general topics: Pomology, Vegetable Gardening, Floriculture, and Seed Growing. The instruction is given both by lectures and by practical operations in the field. Of the two methods of instruction, it is intended that the field work shall be the more important. The Juniors are given instruction by the professor, so far as possible, in sections or squads, in budding, grafting, pruning, tilling, harvesting, marketing and storing fruits and vegetables. All vegetables which are suited to this climate are grown in the vegetable garden, and all desirable small fruits in the fruit garden. Apple, pear, plum, and cherry orchards, and two vineyards, are invaluable aids to the observing student. Students who desire to follow fruit growing and vegetable gardening can secure here the necessary practical training. The class-room lectures also cover the practical points of the subject and enable the student to enter at once upon his field work. The lectures also treat of the principles of plant growth and their relations to cultivation, of the classification and nomenclature of fruits and vegetables, of hybridization and cross-fertilization, and of plant diseases. Instruction is given in the care of hedges, ornamental trees and flowers, and upon the characters and values of native wild fruits. A few lectures are also given upon the history and literature of horticulture when time permits. The horticultural laboratory, the first of its kind in the country, is now completed and occupied. It provides a headquarters for the department, and with its lecture-room and laboratories greatly facilitates the work in horticulture.



IN THE GARDEN.

LANDSCAPE GARDENING.

Landscape gardening is treated as a fine art, and its study is introduced by a discussion of the principles of art in general. Unity, harmony and variety are discussed at length, and abundant illustrations are drawn from the views and plants upon the college premises. The principles of the art of ornamental gardening once understood, they are applied to the ornamentation of parks, cemeteries and large estates, after which practice the student is able to discriminate the features which can be judiciously applied to the embellishment of highways, school grounds and country homes. In practical rural embellishment the subject finds its greatest expansion. Finally, the student is given instruction in rural architecture, in the making of walks and drives, in sodding, grading, etc.

MATHEMATICS.

The course in Mathematics for students of Agriculture is as follows:

ALGEBRA.—The first term of the Freshman year is devoted to the elementary operations of Algebra, the subjects of factoring, least common multiple, greatest common divisor, fractions, radicals, ratio and proportion, application of the binomial theorem, equations of one or more unknown quantities. Five times per week.

The second term Freshman year is given to the subjects of quadratic equations, progressions, development of fractions, inequalities, series, logarithms, loci, and Horner's method of solution of higher equations. Five times per week.

GEOMETRY.—Instruction is given in Plane and Solid (including Spherical) Geometry. The course extends over the third term Freshman and first term Sophomore year. Five times per week. In this subject the effort will be not so much toward covering a given amount of ground as toward developing on the part of the student the power of independent reasoning.

PLANE TRIGONOMETRY.—This subject alternates with Surveying in the third term of the Sophomore year. The ratio system is used exclusively, and considerable prominence is given to the solution of trigonometric equations. Three times weekly.

For students of Mechanic Arts the course is as follows:

ALGEBRA.—Same as for students of Agriculture. See above.

GEOMETRY.—Same as for students of Agriculture except that it is taken in the second and third terms of the Freshman year.

TRIGONOMETRY.—The course includes both Plane and Spherical Trigonometry. It occupies the first term of the Sophomore year. The course in Plane Trigonometry is the same as that for students of Agriculture. The course in Spherical Trigonometry includes the solution of both right and oblique spherical triangles. Five times per week.

ANALYTIC GEOMETRY.—The course includes an elementary treatment of the conic sections, general equations of the second degree, and an introduction to the subjects of Higher Plane Curves, and Geometry of Three Dimensions. Second term Sophomore year. Five times weekly.

DIFFERENTIAL CALCULUS.—The course includes applications of differentiation to the development of functions, maxima and minima, indeterminate forms, and curve tracing. The endeavor is to give the student a clear idea of the logic of the calculus, as well as a working knowledge of the subject.

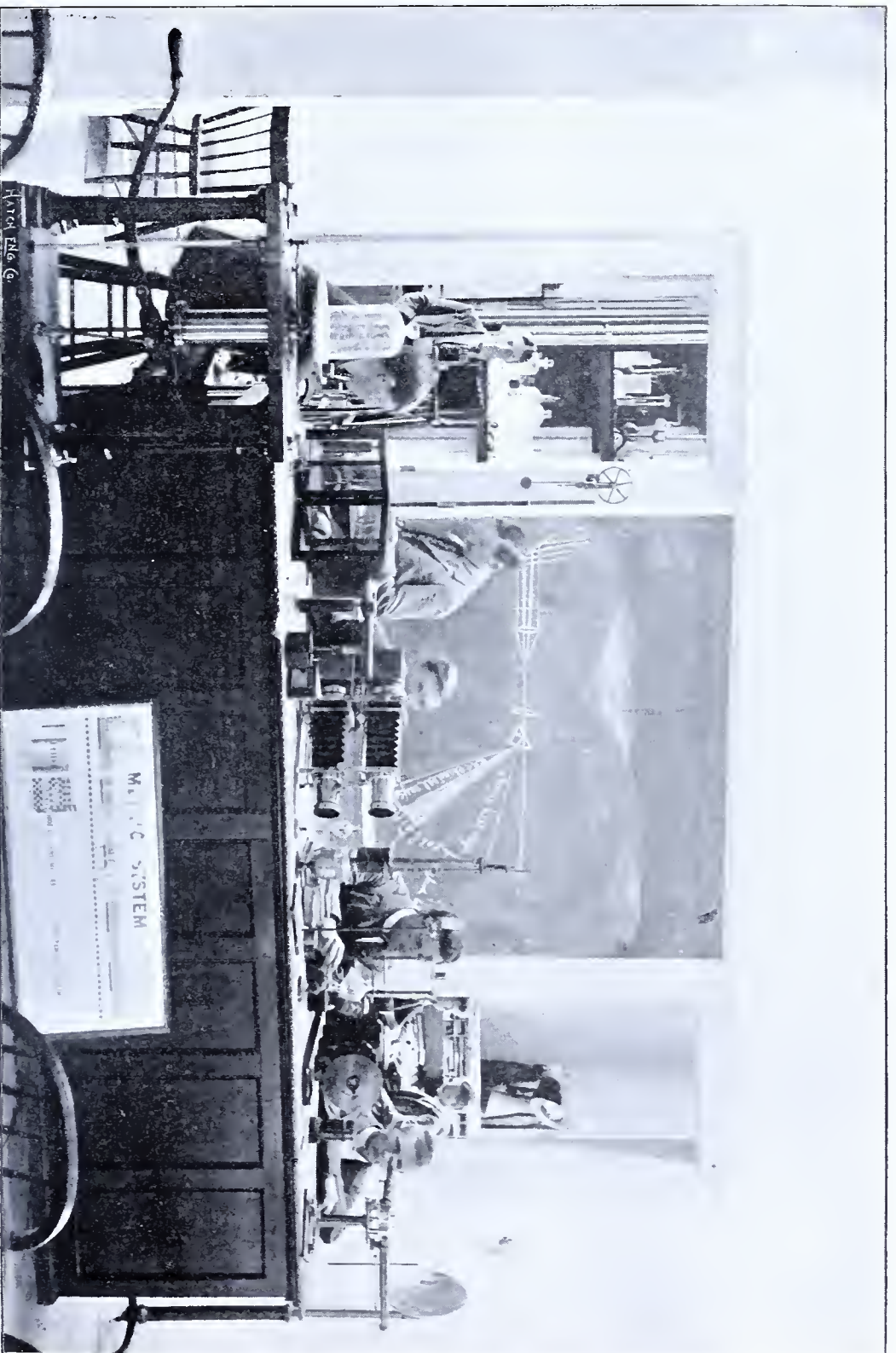
This course is given partly by lectures, and partly from Taylor's Elements of the Calculus. Five times weekly in the third term, Sophomore year.

INTEGRAL CALCULUS.—This subject is pursued during the first term Junior year, and includes the applications of integration to arcs, areas, volumes, etc. Five times per week. Taylor's Elements of the Calculus is used as a text-book.

MECHANICS OF ENGINEERING.—Instruction is given in Statics and Dynamics (Kinetics), during the Spring and Summer terms of the Junior year. Analytic methods are more generally employed, supplemented by graphic constructions and numerous examples of practical application. The text-book used is Church's Mechanics.

MECHANICS AND GENERAL PHYSICS.

The instruction in Physics is by means of lectures and recitations, supplemented by experimental work in the laboratory. In the lectures the general laws of mechanics and heat, acoustics and optics, electricity and magnetism are presented. Experimental demonstrations of all important phenomena are given on the lecture table. The ground covered in both courses is essentially the same, but the method of treatment is quite different. Each course is adapted to the needs and



PHYSICAL LABORATORY—SECTION AT WORK.

previous training of the students. The required course for the Agriculturals is one and one-half terms and covers the subjects of Mechanics and Heat. The lectures and recitations are five days per week without laboratory work.

The elective course for the Agriculturals takes up Optics, Acoustics, Electricity and Magnetism. The laboratory work devoted to the experimental verification of physical formulae is an important feature of the course.

The required Mechanical course is for one year, four days per week, and is an elementary study of all physical agents. This course is supplemented by laboratory work in practice with instruments of precision for the development of skill in physical manipulation.

The elective Mechanical course in Electrical Engineering is five days per week for one term, and is supplemented by six hours per week laboratory practice in the determination of current, electro-motive force, resistance, electrical capacity and magnetic elements.

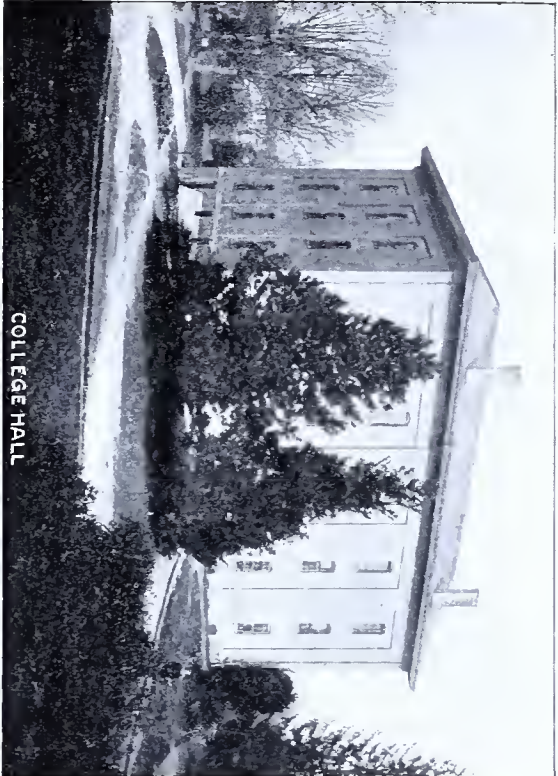
Extra laboratory work is given to meet the wants of those who wish to obtain some knowledge of the methods of physical manipulation.

METEOROLOGY.

The instruction in Meteorology is imparted by lectures. The following topics are treated: Constitution and weight of the atmosphere,—barometry; thermometry,—the variations of temperature, and relations to climate; atmospheric moisture, hygrometers; motions of the atmosphere; anemometers; winds,—trade winds and the anti-trades, monsoons, land and sea breezes; precipitation of moisture,—dew, hoar frost, fog clouds, rain, snow, hail; theory and laws of storms; electrical phenomena; atmospheric electricity,—thunder storms, aurora borealis.

MILITARY SCIENCE AND TACTICS.

The department of Military Science and Tactics was established in 1884 in accordance with the requirements of an act of Congress donating public lands to colleges, one of the conditions being that military tactics should be taught. It is under the control of an officer of the regular army, detailed by the War Department for this duty, without any expense to the State, under the provisions of section 1225, Revised Statutes of the United States. One hundred and fifty Springfield



COLLEGE HALL



CHEMICAL LABORATORY



ARMORY



BOILER HOUSE

SECOND LIEUTENANTS.

- | | |
|--------------------|-----------------|
| 1. F. P. Clark. | 2. A. B. Chase. |
| 3. E. M. Mc Elroy. | |

FIRST SERGEANTS.

- | | |
|-------------------|------------------|
| 1. G. E. Simmons. | 2. M. L. Loomis. |
| 3. W. F. Hopkins. | |

SERGEANTS.

- | | |
|--------------------|--------------------|
| 1. E. C. Peters. | 2. B. A. Stowe. |
| 3. O. H. Pagelson. | 4. W. W. Parker. |
| 5. J. B. Dimmick. | 6. W. Paddock. |
| 7. A. C. Burnham. | 8. J. W. Perrigo. |
| 9. E. B. Hale. | 10. R. B. Pickett. |
| 11. J. Perrien. | 12. J. F. Wight. |

CORPORALS.

- | | |
|---------------------|--------------------|
| 1. G. Ellis. | 2. H. R. Allen. |
| 3. J. P. Churchill. | 4. F. R. Poss. |
| 5. J. E. Niswander. | 6. W. F. Wight. |
| 7. A. D. Himebaugh. | 8. A. S. Groner. |
| 9. J. W. Rittinger. | 10. S. F. Scott. |
| 11. C. B. Smith. | 12. E. R. Pierce. |
| 13. M. G. Kains. | 14. C. S. Goodwin. |
| 15. R. S. Welch. | 16. J. C. Patrick. |
| 17. W. B. Stutsman. | 18. F. M. Nichols. |
| 19. V. V. Newell. | 20. H. S. Emlaw. |

PSYCHOLOGY AND ETHICS.

The first of these sciences has been transferred from the Senior year to the Fall term of the Sophomore year, for the benefit of those students who spend their winters in teaching. The text-book used is McLellan and Dewey. Attention is paid to the practical application of psychological principles to teaching, and a fine list of reference books in both lines have recently been added to the library. Special arrangements will be made to accommodate students who would otherwise be prevented from taking Psychology on account of its change of year. It will be offered as a special Senior elective in the Summer term in 1893 and 1894.

ETHICS is taught by text-book and references, Dewey's Outlines being used as a basis for the work. It is given in the first half of the Junior Fall term.

SHOP PRACTICE.

The shop practice is of the nature of laboratory work, and is without pay, and is chiefly incidental to the mechanical course.

A series of exercises is selected principally with reference to giving the student practical information in the use of machine tools. So far as possible these exercises consist of practice on articles intended for use, and are constructed under the immediate oversight of a skilled workman. The shops are run, as far as possible, the same as actual manufacturing institutions. The results attained by trial of such methods for sixteen years in similar institutions have shown conclusively that work in connection with instruction, and parallel to it, gives the student more skill than can be obtained without such instruction in twice the time by shop work alone. Again, the shop work is of value as a practical illustration of the precepts taught in the class-room.

WORK IN WOOD SHOP.

The Mechanical Freshmen spend the year in the wood shop. The Agricultural Freshmen spend the first half of the Spring term in the wood shop.

The First Term—

The work done relates to the primary operations of carpentry, such as exercises relating to the use of tools, putting tools in order, and the construction of a series of exercises graded according to the skill of the student. The work of this term is confined principally to carpenter work and joinery. Practice is given in the construction of mortise and tenon, dovetail and other joints.

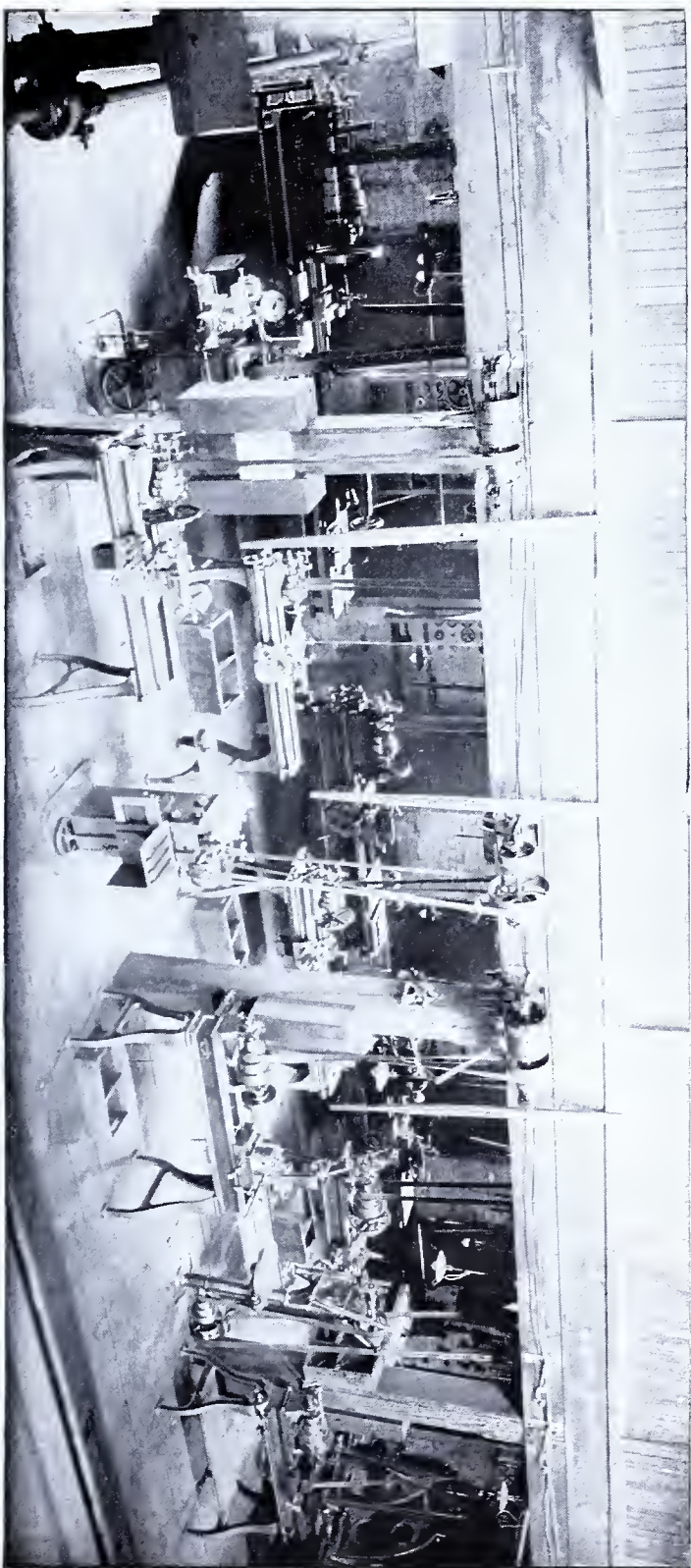
The Second Term—

During the second term the work relates to advanced joinery, turning, and cabinet making. Practice will also be given in the use of machine tools for working wood.

The Third Term—

During this term the time is devoted to the making of patterns and core boxes, particular attention being given to the principles of molding.

So far as is consistent with good instruction, the work of the wood shop is applied to articles actually to be used. Out of the regular practice hours students are allowed the use of their case of tools for private work,



INTERIOR OF IRON SHOP.

whenever the instructor can be present, and otherwise when possible, without detriment to the tools. Mechanical ability is encouraged in every possible way. Each student in the shop (or each two students) has assigned for use a case of tools, consisting of a set of four planes, brace and set of bits, three saws, set of chisels, try square, bevel, marking gauge, bradawl, oil stone and oil can. No one else is permitted to use these tools, so that the students to whom they are assigned can be held responsible for their condition. No tools are permitted to be taken from the work room.

WORK IN THE IRON SHOP:

The work in the Iron Shop extends through the remainder of the course, and includes the practical operations of forging, vise work, finishing, machine work and erecting. This work is as far as possible applied toward the construction of some useful article or machine. Beginning with the care and use of the tools with which he is to work, the student is carried through the various operations of machine shop practice. The students have already built four engine lathes, four iron bed wood lathes, one patternmaker's lathe, one twenty-five horse-power engine, one fifty incandescent light dynamo, one twelve-inch iron shaper, one twist drill grinder, one improved center grinder, one steam pump, and one combination buzz saw, besides various small articles. Since the addition of the universal grinding machine to the shop equipment, the students have done a large variety of work on hardened steel, as plain and angle milling cutters; rose, shell and taper reamers; hardened steel mandrels; standard plugs, rings, etc. There are at present under construction in the shops one fifty horse-power high speed tandem compound engine, which when completed will be used to drive the shops, one buzz planer, one boring machine, two iron-bed wood lathes, one boring and facing attachment, and various small tools. In the forge shop the students are taught the methods of forging and welding iron and steel, special attention being given to the forging and tempering of lathe and planer tools.

Accurate record is kept of the progress of each student, and at the end of his course, if desired, papers will be furnished giving record of skill.

Besides the required work, which is usually ten hours per week, students are encouraged to attain additional skill by having allowed to them, on Saturday forenoon, when circumstances will permit, the privileges of the shop for any work which they may undertake for

themselves. Several students have built vertical engines of from one to six horse-power.

The Iron Shop is provided with a separate tool room, and is conducted the same as a manufacturing establishment.

During the spring term the Agricultural Sophomores work in the blacksmith shop in three sections, each section working two weeks twelve and one-half hours per week.

VETERINARY SCIENCE.

The instruction in this subject is given in lectures and practice extending over the entire Senior year. The branches discussed are summarized below :

ANATOMY.—Lectures describing the various organs entering into the formation of the animal economy of the horse, ox, sheep, and hog, illustrated with skeletons, models, diagrams, and dissections made from the original subject by the students.

ZOO-PATHOLOGY.—Lectures upon the principal diseases of the domestic animals, describing the nature, causes, symptoms, treatment, and prevention of them, illustrated with pathological specimens and individual cases when possible.

OPERATIVE SURGERY.—Practical illustrations by performance of various operations.

OBSTETRICS.—Care and management of pregnant animals, attention to the offspring, what to be done and *what not to be* done in difficult cases of parturition, etc., etc.

MATERIA MEDICA. —Lectures upon the actions, uses, and abuses, and doses of upwards of a hundred of the chief medicines used in veterinary practice.

For the purpose of teaching the various branches of this department a spacious laboratory has been erected, containing a large lecture room for class exercises, a museum, in which will be found pathological and other specimens, among them the complete model of a horse, which separates into ninety-seven pieces, exhibiting over 3,000 anatomical objects in detail, also the skeleton of a horse, an ox, a sheep and a hog. The pathological specimens illustrate the diseases of bone and other structures ; among them are many valuable ones. To aid in the study of materia medica are over a hundred samples of the principal drugs used in

the treatment of disease. A large case of instruments has been added for performing various operations, and a microscope for doing work in histology. The dissecting room is equipped for practical work in anatomy, while the operating room is so arranged that operations can be conveniently performed before the class.

ZOÖLOGY.

Under this title are included (1) Comparative Anatomy and Physiology, (2) General Zoölogy, (3) Entomology.

I. COMPARATIVE ANATOMY AND PHYSIOLOGY.—The instruction is given in a course of lectures upon Human Physiology, while particular attention is given to the anatomy and physiology of domestic animals. The course is illustrated by models, anatomical preparations, and diagrams representing the comparative structure of the organs of locomotion, digestion, circulation, respiration, and reproduction in each branch of the animal kingdom. Each student spends some time during the spring term in the dissection of animals, that he may become familiar with the appearance, situation and relation of the organs of the animal system in a state of health, and the changes produced by disease. Opportunities are given for the study of the minute structure of the various tissues by means of the microscope.

II. GENERAL ZOÖLOGY.—The following topics are presented in a course of lectures covering six weeks; principles of the classification of animals as founded on their structure and embryonic development; descriptive zoölogy, comprising the systematic arrangement of animals in accordance with their natural affinities, in classes, orders, families, etc.; habits and geographical distribution of animals. Three hours a week are devoted to laboratory work, consisting of dissections, microscopic study of animals and animal histology.

Thorough investigation is given to some class of animals, the student determining species by actual observation and study of the species themselves. This makes the student familiar with those structural features which are valuable in classification.

III. ENTOMOLOGY.—This study is pursued during the Summer term, when the outdoor conditions are most favorable for practice. The lectures embrace the anatomy of insects, their transformations, development, geographical distribution and classification. Particular attention

is given to species injurious to vegetation, their habits, and the methods of checking their ravages. The students all make, under the professor's supervision, detailed examination of various species in each order, by dissecting under the microscope, and drawing the various structural peculiarities that are important in determining the families and genera. Generic determinations are made in several orders by use of such works as Cresson's, Le Conte and Horn's, and Comstock's. By collecting, preserving and rearing specimens of our native species, the students become familiar with insect habits and transformations. The science and practice of bee-keeping also receive attention. The races of bees are discussed, and the students, by actual practice, are made familiar with the various manipulations of the apiary. Valuable means of illustration are afforded by the faunal, scientific, and economic collections of specimens of the General Museum, and by elaborate and carefully prepared charts.

The large McMillan Collection is specially helpful in the study of Systematic Entomology.



GENERAL EQUIPMENT.

THE COLLEGE LIBRARY.

The library contains nearly sixteen thousand volumes. It is well supplied with scientific and technical works, and with the journals of agriculture and allied arts. Each of the departments of instruction is equipped with a serviceable collection of books of reference. Current publications recording the results of investigations in the sciences and useful arts are added as means will permit. There is a good equipment in history, pedagogy, and general literature. Liberal appropriations have been made by the legislature for the maintenance and extension of the collection.

Students have access to the library fourteen hours daily, and they are permitted to draw books for reading in their rooms, excepting works of reference and bound volumes of the leading serial publications.

Connected with the library is a reading room supplied with over two hundred periodical publications, including the leading English and American periodicals.

The libraries of the Natural History Society and of the College Y. M. C. A. are deposited with the College Library.

MUSEUMS AND LABORATORIES.

AGRICULTURAL LABORATORY.—This building affords a lecture room with seating capacity for sixty students. Besides this, on the first floor are two offices provided with cases and a good collection of agricultural works, including the herd registers of the leading breeds of live stock. A work room and dark closet, with an elevator room, complete the first floor.

On the second floor are the museum and three smaller rooms, at present occupied by the Botanical Department, but ultimately to be filled with specimens of agricultural interest.

BOTANICAL LABORATORY.—The Botanical Department occupies, temporarily, some very convenient rooms in a portion of the Agricultural Laboratory. An appropriation of \$10,000 was made by the last legislature (1891) to erect a new building to take the place of the one destroyed by fire in March, 1890. The new building will be ready for use in the spring of 1893.

CHEMICAL LABORATORY.—The chemical laboratory includes a lecture-room for one hundred and fifty students, analytical rooms, fitted with evaporating hoods and tables for sixty-eight students, the professor's private laboratory and study, and a suite of rooms for students in metallurgy and quantitative chemical analysis. It contains the chemical apparatus and stores; a full set of instruments for meteorological observations, such as are used in the United States Signal Service; assay furnaces and balances.

HORTICULTURAL LABORATORY.—The Horticultural Laboratory provides a lecture-room for seventy students; a museum and specimen room for collection of seeds, fruits and other horticultural products, and apparatus for class-room instruction; a laboratory and work room, seed room, grafting room, and rooms for the storage of fruits, vegetables, trees, scions, etc. The private study contains the Lyon Library, of nearly five hundred volumes. The hand tools, used by the students in the manual labor in the gardens and on the grounds are kept in a large and well-lighted room on the first floor. A room in the basement provided with a sink and tables affords opportunity for practical instruction in the methods of preparing vegetables and fruits for market.

GENERAL MUSEUM.—The General Museum contains skeletons and preserved specimens of typical mammals and birds from all parts of the world, reptiles, batrachians; the fauna of Michigan is specially well represented; a large collection of shells, native and exotic; a collection of invertebrates from the Smithsonian Institution; three collections of insects; a faunal, a scientific, and an economic; a manikin, skeletons of man and of the lower animals; alcoholic and microscopic preparations of animal organs and tissues; fossils from all the groups of rocks; rock specimens illustrating the divisions in Lithologic Geology; and a small but growing collection in Ethnography.

MECHANICAL LABORATORY AND WORK SHOPS.—This building contains a class-room for thirty students, a drawing-room for the work of

the first and second year, a designing room for advanced work during the Junior and Senior years, a testing room for work in strength of materials and a small Experimental Laboratory for engine testing and other work involving the use of steam, water or gas. A blue print room is on the second floor of this building.

Cases for catalogues, drawings, instruments and manufactured articles are to be found in these rooms.

Work Shops.—In this building there is also a machine shop, two stories, fifty by sixty feet; a wood shop, two stories, fifty by sixty feet, and a blacksmith shop thirty feet square.

The equipment of the machine shop is as follows:

- 1 twenty-five horse-power engine driving 195 feet of line shaft.
 - 1 twenty-four inch Putnam lathe, twelve foot bed with compound rest.
 - 1 eighteen inch Reed lathe, eight foot bed.
 - 1 sixteen inch Pratt and Whitney lathe, seven foot bed with Slate's taper attachment.
 - 2 ten inch Reed lathes, five foot bed. screw cutting.
 - 2 fourteen inch lathes, five foot bed, made in the shops.
 - 2 ten inch lathes, seven foot bed, made in the shops.
 - 1 fourteen inch Turret lathe, five foot bed. made in the shops.
 - 1 ten inch Warner & Swasey speed lathe.
 - 1 twenty-four inch by twenty-four inch by eight foot bed Gray planer.
 - 1 twelve inch shaper, made in shops.
 - 1 six inch Boynton shaper.
 - 1 Reed power drill-press.
 - 1 Slate's sensitive drill-press, with centering attachment.
 - 1 Slate's Universal tool grinder.
 - 1 No. 1 Brown & Sharpe Universal Milling Machine, with attachments.
 - 1 No. 2 Improved Brown & Sharpe Universal Grinding Machine, with attachments.
 - 1 four foot Betts Universal Radial Drill, with complete set of twist drills.
 - 1 complete set of machinist taps to $1\frac{1}{8}$ inches with friction sockets for use in drill-press. (Presented by Beaman & Smith, of Providence, R. I.)
 - 1 twist drill grinding machine.
 - 1 center grinding machine.
 - 1 Gisholt Universal tool grinding machine.
- Also a complete assortment of small tools and gauges. In this shop

there are twenty vises with sufficient bench room for that number of students.

The equipment of the Wood shop is as follows:

4 ten inch iron bed wood lathes.

2 ten inch wood bed wood lathes.

1 pattern maker's lathe.

1 Clements band saw.

1 Clements two spindled shaping machine.

1 sixteen inch, Frank & Co., double surfacing planer.

1 combination buzz saw.

1 Fox trimmer.

1 iron frame miter saw.

40 cases of bench tools and a good assortment of miscellaneous small tools.

The shop is equipped with thirty patent iron vises.

Blacksmith Shop.—In the blacksmith shop are eleven forges receiving a pressure blast from a Sturtevant blower.

2 vises and a good assortment of forge shop tools.

1 brass furnace and one tempering furnace.

PHYSICAL LABORATORY.—The department of Physics occupies the north wing of the Chemical Laboratory. The main floor contains a lecture room for eighty students, an office and work room. The equipment for lecture table experiments is very complete. The table is fitted with a small water motor and connections for water, both high and low pressure, gas, steam, vacuum, dynamo and batteries. The stereopticon with Calcium or arc light is used in many demonstrations. A solid pier permits the use of delicate apparatus before a large class. On the lower floor is a suit of rooms arranged for experimental work. A dark room is used for photometric work and the study of photography. Another has boiler, engine and various types of dynamos and motors. The storage batteries, used for lighting the laboratory, and all other batteries are in a separate room. Another is used for measurement with the magnetic needle. The apparatus cases contain a fine collection of instruments, valued at about \$10,000.

VETERINARY LABORATORY.—The Veterinary Laboratory, commodious and well-equipped, contains a fine large lecture room, a museum well supplied with material for illustration, and a working laboratory and hospital where clinical instruction can be given.



MECHANICAL LABORATORY.

ZOOLOGICAL LABORATORY.—The Zoölogical Laboratory consists of a lecture room for eighty students, rooms for anatomical study and histological work, and a private study containing a good zoölogical library.

In connection with the laboratory is the large McMillan Collection, which, with specimens added at the College and by exchanges, forms one of the finest insect cabinets of the west.

ARMORY AND GYMNASIUM.

The College Armory contains a large, well-lighted drill-hall for use in inclement weather, a room for gun racks, and an office for the commandant of cadets. The parade ground in front of this building is admirably adapted for tactical maneuvers.

The drill hall of the armory serves also as a gymnasium. The gymnastic apparatus is so arranged that the floor is readily cleared for drill. The Freshmen are taken through a systematic course of Calisthenics and Gymnastic training as a part of their military work.

THE COLLEGE FARM.

The tract of land upon which the college is situated comprises 676 acres. Of this the lawns and building sites, the gardens and orchards, cover about 100 acres. There are over 200 acres of original forest. The improved land constituting at present the farm proper is devoted to the following uses: 22 acres to experiments; 170 to a systematic rotation of crops; and 110 to woodland pasture.

BUILDINGS.—There are barns on improved plans for horses, cattle, and sheep; grain, tools and feeding experiments, and a piggery containing ten pens, with yards attached.

CATTLE.—A herd of Short-Horns, with fine specimens of Ayrshire, Galloway, Holstein-Frisian and Hereford.

SHEEP.—Spanish Merino, Southdown, and Shropshire.

SWINE.—Poland China and specimens of Berkshire.

ADDITIONAL EQUIPMENT FOR ILLUSTRATION.

AN APIARY, with specimens of Italian, Syrian, Carniolan and Punic bees, various styles of hives and honey extractors, and other improved apparatus; noted honey plants—shrubs, trees and herbs.

AN ARBORETUM and sample grounds for timber trees.

A BOTANIC GARDEN of native and foreign hardy plants, mostly labeled; also a large number of grasses, clovers and other forage plants as a part of the experiment station.

THE COLLEGE CAMPUS, comprising nearly one hundred acres, laid out in flower gardens, lawns, walks and drives. It exhibits a good variety of herbaceous plants and ornamental shrubs and trees, and furnishes altogether abundant and excellent illustrations of landscape gardening.

EXPERIMENTAL HEDGES AND SCREENS of different kinds.

TWO FORCING HOUSES, used for forcing during the winter, vegetables, fruits and flowers, and for the growing of vegetable plants in the spring. One house is heated by hot water and the other by steam, and they afford the opportunity for a comparison of the economy and efficiency of the two methods of heating.

THE FRUIT GARDEN, comprising four acres, inclosed by a windbreak. In this garden are furnished illustrations of all the operations of small fruit growing, and also tests of all promising hardy new fruits. It contains a very complete collection of raspberries, blackberries, currants, gooseberries, strawberries, quinces, Russian apples, Russian apricots, Russian mulberries, wild fruits, etc.

A GREENHOUSE of seven rooms, containing a choice collection of the best ornamental plants, and of those used in the arts. The structure erected in 1874 having become badly decayed, it is being replaced. The new house will be both longer and higher than the old one, and as it will have iron sills, rafters, purlins and ridge, it should last for many years. It will be heated with coils of one and one quarter inch pipe, supplied with hot water.* The benches will be of iron with slate tops. The work in the greenhouses and forcinghouses is performed by the students under the direction of the foreman, and they thus become familiar with the various operations.

ORCHARDS, containing pears, plums, cherries, and apples in great variety.

A SMALL ASTRONOMICAL OBSERVATORY, containing a fine five-and-one-half inch telescope, equatorially mounted and driven by clock-work.

THE VEGETABLE GARDEN, including about seven acres, in which are grown all vegetables suited to the climate. These gardens not only furnish invaluable instruction in all the processes of gardening, from the hot-bed to the winter storing, but they supply the College tables.

VINEYARDS, including nearly all the hardy varieties of grapes.



AGRICULTURAL LABORATORY



HORTICULTURAL LABORATORY



GREEN HOUSE



FORGING HOUSE

MISCELLANEOUS INFORMATION.

DISCIPLINE.

The maintenance of order in the dormitories and boarding halls is largely intrusted to the students, who for this purpose have organized themselves into wards. These select captains and lieutenants, who make and execute rules. Each ward holds an election for the choice of officers by ballot, on the second Saturday of each term. The executive officers meet weekly with the president of the College.

INSPECTION OF ROOMS.

The rooms of students living in the College Halls are inspected daily, Sundays excepted, by officers of the cadet battalion, under the supervision of the Military Department.

The following rules have been established for the police and general arrangement of the rooms:

1. Floors are to be properly swept. Sweepings to be placed in dust box in the halls.

Each room orderly will be held responsible for that portion of the hall immediately in front of his door.

2. Beds are to be neatly made up, folding beds to be closed.

3. Wash basins and pitchers are to be clean and in place; buckets by the side of washstands.

4. Waste-water buckets are to be empty and clean.

5. Books, papers, etc., are to be neatly placed on tables or shelves.

6. All other articles are to be neatly and properly arranged.

7. The room and all articles are to be properly dusted.

8. Closet doors are to be open and all articles therein to be properly and neatly arranged.

9. Shoes are to be kept in the closet.

10. Soiled linen is to be kept in a bag, basket, or other place especially appointed for this purpose.

Excuses for absence from College to attend meetings and encampments of various organizations will be granted only in extraordinary cases, and only to students whose class record is high. Any unexcused absence to attend such organizations will sever the student's connection with the College.

SOCIETIES AND PUBLICATIONS.

The students have organized several literary societies, which hold their meetings on Saturday evenings. The exercises consist principally of discussions, essays, and lectures. Public meetings are held only by permission of the Faculty.

BOTANICAL CLUB.—Some of the students and teachers, especially interested in Botany, organized a club in the spring of 1891. Meetings are held three times a month, with an average attendance of about fifteen persons.

COLLEGE CORNET BAND.—The students maintain a musical association known as the College Cornet Band, in charge of the Military Department.

GERMAN CLUB.—A club for the study of German masterpieces and for conversation in German holds weekly meetings.

MECHANICAL CLUB.—The teachers and students of the Mechanical Department have put into successful operation and maintained for some years a Mechanical Club. Its meetings are held once every two weeks.

NATURAL HISTORY SOCIETY.—The members of the Faculty have united with the students in the organization of a Natural History Society, which possesses a library and a museum. Its regular meetings are on the second Friday of each month, at 7 P. M.

SHAKESPEARE CLUB.—A club for the study of Shakespeare's plays and the great masterpieces of other literary men meets weekly at the houses of various members of the Faculty.

YOUNG MEN'S CHRISTIAN ASSOCIATION.—The College Christian Union, which was formed in 1871, gave place in 1881 to a Young Men's Christian Association. It maintains a prayer meeting in the Association room on Thursday and Sunday evenings at 7 o'clock, a Sunday school library; and also furnishes a lecture at least once a term.

ALUMNI ASSOCIATION.—The graduates have formed an association which meets at the College at the time of commencement once in three

years. The next reunion will occur at commencement in August, 1894. At the last meeting the following officers were chosen:

President—DANIEL STRANGE, '67.

1st vice president—ALBERT DODGE, '77.

2d " " —HERBERT BAMBER, '81.

3d " " —FRANK R. SMITH, '87.

Secretary and Treasurer—HENRY THURTELL, '88.

Orator—CHAS. C. GEORGESON, '78; *alternate*—C. E. SMITH, '84.

Historian—OSMOND C. HOWE, '83; *alternate*—J. C. STAFFORD, '88.

Poet—HERBERT W. COLLINGWOOD, '83; *alternate*—F. S. BURTON, '68.

The ANNUAL CATALOGUE is published during the Summer term.

The secretary of the State Board of Agriculture issues a REPORT each year, containing the statement of accounts, department reports, proceedings at institutes, proceedings and reports of the State Agricultural Society, and the register of meteorological observations at the College. A bulletin is also issued each month, giving an account of agricultural experiments, and of other matters of interest to farmers.

The COLLEGE SPECULUM is published monthly during the academic year by the students.

DAILY ROUTINE.

The following is the program for each day, except Saturday and Sunday:

- | | |
|--|------------------------------------|
| 6 A. M.—Morning bell. | 7:45 A. M.—Chapel exercises. |
| 6:30 A. M.—Breakfast. | 8 to 12 A. M.—Classes as in Table. |
| 7:10 to 7:40 A. M.—Inspection of rooms. | |
| 7 to 12 A. M.—Study hours. | |
| 12 M.—Dinner. | |
| 1 to 5 P. M.—Work and drill hours as per Table. | |
| 6 P. M.—Supper. | |
| 7 P. M.—Study hours begin spring and fall terms (except on Fridays). | |
| 7:30 P. M.—Study hours begin summer term. | |

On school days the Library is open from 8 to 12 in the morning, from 1 to 6 in the afternoon, and from 7 to 9:30 in the evening; on Sunday from 9 to 12 A. M., and 3:30 to 5:30 P. M.; and on Saturday from 8 to 12 A. M. and 1 to 6 P. M.

Friday, 7 P. M.—Meeting of Mechanical Club in the mechanical lecture

room on the first and third Friday of each month. Meeting of the Natural History Society on the second Friday of each month.

Saturday, 8 A. M.—Meeting of Ward Captains and Lieutenants.

Saturday, 11 A. M.—Study hours close for the day.

Exercises on Sunday are as follows:

6:30 A. M.—Morning bell.

8:30 A. M.—Chapel exercises.

7 A. M.—Breakfast.

12 M.—Dinner.

2:30 P. M.—Sabbath services, conducted by some member of the Faculty or some one of the clergymen of Lansing.

5:30 P. M.—Supper.

7 P. M.—Prayer meeting or lecture before the Young Men's Christian Association.

GROUNDS AND BUILDINGS.

THE COLLEGE is located on the banks of the Red Cedar River, about three miles east of the city of Lansing. The buildings, mostly of brick, stand upon a slight eminence among the forest trees, which have been purposely retained. The grounds about the college buildings and residences have been laid out with considerable regard for ornamental effect. They are under the care of the Horticultural Department.



VETERINARY LABORATORY, MECHANICAL LABORATORY, AND WELLS HALL.

INDEX.

	Page.		Page.
Absence, excuses for.....	70	Captain of Cadets.....	56
Adjutant of Cadet Corps.....	56	Carpenter shop, work in.....	58
Admission, age for.....	22-25	Catalogue of students.....	11
Admission from other Colleges.....	28	Catalogue, publication of.....	71
Admission on certificate.....	27	Cattle, breeds of.....	67
Admission on diploma.....	27	Chamberlain, Hon. Henry.....	5
Admission on teacher's certificate.....	27	Chemical Laboratory, described.....	64
Admission, requirements for.....	26	Chemistry, course in.....	43
Admission to advanced standing.....	23	Civil Engineering, course in.....	45
Advance payments, list of.....	34	Classes, enrollment in.....	30
Advanced degrees, condition for.....	35	Club, Botanical.....	70
Advanced standing, admission to.....	28	Club, German.....	70
Age for admission.....	22-26	Club, Mechanical.....	70
Agricultural Chemistry, course in.....	44	Club, Shakespeare.....	70
Agricultural Course, described.....	41	Clubs for boarding.....	32
Agricultural Engineering.....	46	Clute, Pres. O., member of Board of	
Agricultural Laboratory, described.....	63	Agriculture.....	5
Agricultural students, number of.....	21	College calendar.....	5
Agriculture, Board of.....	5	College farm.....	67
Agriculture, course in.....	36	Colleges, admission from other.....	23
Algebra, course in.....	53	Comparative Anatomy, instruction in.....	61
Alumni Association.....	70	Composition, course in.....	49
Analysis, chemical course in.....	44	Conferring degrees, power of.....	23
Anatomy, course in.....	61	Constitutional provision.....	22
Ancient History, course in.....	51	Cornet Band.....	70
Apiary.....	67	Corporals of Cadets.....	57
Arboretum.....	67	Cost of attendance.....	33
Armory, described.....	67	Course of study, law of.....	23
Association, Alumni.....	70	Courses of instruction in detail.....	36
Association, Y. M. C. A.....	70	Cryptogamic Botany, course in.....	43
Astronomical observatory.....	23	Daily routine.....	71
Astronomy, course in.....	42	Date of beginning of terms.....	3
Attendance, conditions of.....	31	Davis, B. F., treasurer.....	5
Average expense of attending.....	33	Declamations required.....	49
Babcock, Hon. S. S.....	5	Degrees conferred in 1891.....	10
Bachelors of Science.....	10	Degrees conferred, what they are.....	35
Band, College Cornet.....	70	Degrees, power of conferring.....	23
Board, deposit required for.....	32-34	Departments of instruction, described.....	41
Board of Agriculture, course of in-		Deposit on board.....	32
struction regulated by.....	23	Diploma fee.....	31
Board of Agriculture, degrees to be		Diploma from high schools, admis-	
conferred by.....	23	sion on.....	27
Board of Agriculture, members of.....	5	Discipline.....	69
Board of Visitors.....	5	Drawing, free-hand.....	45
Boarding Clubs.....	32	Drawing and designing.....	47
Boilers, steam.....	46	Drawing, mechanical.....	47
Books, cost of.....	33	Drill Hall, described.....	67
Botanical club.....	70	Elective studies.....	37
Botanical garden.....	68	Elementary Chemistry, course in.....	43
Botanical Laboratory, described.....	64	Elocution, course in.....	49
Botany, course in.....	42	Engine, steam.....	46
Buildings.....	72	Engineering, agricultural.....	46
Bulletins.....	71	Engineering, civil.....	45
Butterfield, Hon. I. H.....	5	Engineering, mechanics of.....	54
Cadet officers.....	56	Engineering, mechanical.....	46
Calendar.....	3-4	English Language, course in.....	48
Calculus, course in.....	54	Entomology, course in.....	61
Campus.....	68	Entrance examinations.....	26

	Page.		Page.
Equipment, description of.....	63	Iron Shop, work in.....	59
Equipment for illustration.....	67	Junior agricultural studies in detail.....	36
Essays required.....	49	Junior Class, list of.....	13
Ethics, course in.....	57	Junior mechanical course.....	39
Examinations for admission.....	26	Labor, number of hours required.....	23
Examinations in course.....	31	Labor of students, paid.....	25, 33
Examinations, rules for.....	31	Labor of students, remarks upon.....	24
Excuses for absence.....	70	Laboratories described.....	63
Expenses and fees.....	31	Laboratory expenses.....	31
Experimental work.....	26	Lady students, number of.....	21
Faculty, members of.....	6	Landscape Gardening, course in.....	53
Faculty, who constitute.....	23	Languages, course in.....	48, 51
Farm buildings.....	67	Law of College.....	22
Farm, description of.....	67	Law of student labor.....	23
Farm, work on.....	25	Law organizing College.....	22
Farmers' Institutes.....	40	Law, requiring military instruction.....	23
Fees and expenses.....	31	Leave of absence, how obtained.....	70
Finance, course in.....	52	Leveling, course in.....	45
Fitch, Hon. F. S., Superintendent of Public Instruction.....	5	Library described.....	63
Forcing-houses.....	68	Lieutenants of Cadets.....	56
Forestry, course in.....	43	List of officers.....	6
Foundation of College.....	23	List of students.....	11
Free-hand Drawing, course in.....	45	Literary societies.....	70
French, course in.....	51	Literature, course in.....	48
French, Supt. E. M.....	5	McMillan collection.....	62, 67
Freshman mechanical course.....	38	Major of Cadets.....	56
Freshman studies in detail, agricult- ural.....	36	Manual labor, law for.....	23
Freshmen, list of.....	17	Manual labor, pay for.....	26, 33
Fruit garden.....	68	Manual labor, reason for.....	24
Furnishing room, estimate of cost.....	33	Manual labor, remarks on.....	24
Garden, botanical.....	68	Master's degree, condition for.....	35
Garden, fruit.....	68	Masters of Science.....	10
Garden, vegetable.....	68	Mathematics, course in.....	53
Garden, work on.....	25	Matriculation, cost of.....	31
Gardening, Landscape.....	53	Mechanical Club.....	70
Garfield, Hon. Charles W.....	5	Mechanical course in detail.....	38
General Museum.....	64	Mechanical Drawing, course in.....	47
Geology, course in.....	51	Mechanical Engineering, course in.....	46
Geometrical Drawing, course in.....	47	Mechanical Laboratory described.....	64
Geometry, course in.....	53	Mechanical students, number of.....	21
German Club.....	70	Mechanics, courses in.....	54
German, course in.....	51	Mechanics of engineering.....	54
Glidden, Hon. A. C.....	5	Members of Board of Agriculture.....	5
Government by students.....	69	Members of College Faculty.....	6
Graded schools, admission from.....	27	Mental Philosophy, course in.....	57
Graduate students, conditions for.....	29	Meteorology, course in.....	55
Graduate students, number of.....	24	Military Science, course in.....	55
Graduating fee.....	31	Military uniforms.....	34
Grammar, course in.....	48	Miscellaneous information.....	69
Grapes.....	68	Money necessary to start in with.....	34
Graphics of framed structures.....	46	Museums described.....	64
Greenhouses.....	63	Natural History Society.....	70
Grounds.....	72	Non-commissioned officers of Cadets.....	56, 57
Gymnasium described.....	67	Observatory.....	68
High schools, admission from.....	27	Officers of Alumni Association.....	71
Historian of Alumni Association.....	71	Officers of Cadet corps.....	56
History, course in.....	51	Officers of College.....	6
History of College.....	23	Orations, requirement of.....	50
Honorary degrees.....	10	Orator of Alumni Association.....	71
Horticultural Laboratory described.....	64	Orchards.....	68
Horticulture, course in.....	52	Organic Chemistry, course in.....	44
Hours required for labor.....	25	Organic law of College.....	22
Howe, Hon. O. C.....	5	Original essays, required.....	49
Hydранics.....	46	Payments required in advance.....	34
Incidental expense fee.....	32	Phelps, Hon. Edwin.....	5
Information, miscellaneous.....	69	Physical culture required.....	23
Insects, study of.....	61	Physical Laboratory described.....	66
Inspection of rooms.....	69	Physics, course in.....	54
Instruction, course in detail.....	36	Physiological Botany, course in.....	42
Institutes, farmers'.....	50	Physiology, course in.....	61
Iron Shop, course in.....	59	Poet of Alumni Association.....	71
		Police of rooms.....	69
		Political Science, course in.....	51

	Page.		Page
Post-Graduate students, list of.....	11	State Board of Agriculture.....	5
Practical Agriculture, course in de- scribed.....	41	State Board of Visitors.....	5
Practice in shops.....	58	Station Council.....	10
Preparatory class.....	27	Statutory provisions.....	23
Program of daily exercises.....	71	Steam boilers.....	46
Projection Drawing, course in.....	47	Steam engine, course upon.....	46
Psychology, course in.....	57	Strength of material, course in.....	48
Publications.....	71	Structural Botany, course in.....	42
Public Instruction, Superintendent of.....	5	Student government.....	69
Qualitative Analysis, course in.....	44	Student labor, law of.....	23
Quantitative Analysis, course in.....	44	Student labor, remarks on.....	24
Quartermaster of Cadet corps.....	58	Student labor, rules governing.....	25
Report of Secretary of Board of Agri- culture.....	71	Students, list of.....	11
Requirements for admission.....	26	Students, summary of.....	21
Rhetorical Exercises, course in.....	49	Studies required by law.....	22
Rhetoric, course in.....	49	Summary of students.....	21
Room furnishing, estimate of cost.....	33	Summer school.....	29
Room rent.....	32	Superintendent of Public Instruction.....	5
Rooms, police of.....	69	Surveying, course in.....	45
Rooms, inspection of.....	69	Swine, breeds of.....	67
Roster of military officers.....	58	Systematic Botany, course in.....	43
Routine, daily.....	71	Table of expenses.....	33
Rules for police of rooms.....	69	Tactics, course in.....	55
Rules governing student labor.....	25	Terms and vacations.....	30
Scholarship and attendance.....	31	Text-books, cost of.....	33
Science, Bachelors of.....	10	Thermo-dynamics, course in.....	47
Science of mind, course in.....	57	Tools, practice with.....	58
Scientific agriculture.....	24	Trigonometry, course in.....	53, 54
Select courses.....	28	Uniforms, military.....	34
Self government.....	69	U. S. History, course in.....	52
Senior agricultural course.....	37	Vacations.....	30
Senior class, members of.....	12	Vegetable garden.....	68
Senior mechanical course.....	39	Veterinary Science, course in.....	60
Sergeants of Cadets.....	57	Veterinary Laboratory described.....	66
Shakespeare Club.....	70	Vineyards.....	68
Sheep, breeds of.....	67	Visitors, Board of.....	5
Shop practice, course in.....	53	Volumetric Analysis, course in.....	44
Shops described.....	65	Wells, Hon. Franklin.....	5
Societies, Literary.....	70	Winans, Gov. Edwin B.....	5
Society, Natural History.....	70	Wood Shop, work in.....	58
Sophomore agricultural studies in de- tail.....	36	Woodwork, course in.....	58
Sophomore class, list of.....	15	Work in iron shop.....	59
Sophomore mechanical course.....	38	Work in wood shop.....	58
Special examinations.....	31	Work on farm or gardens.....	25
Special students, list of.....	20	Work shops described.....	64
Speculum.....	71	Young Men's Christian Association.....	70
		Zoological Laboratory described.....	67
		Zoology, course in.....	61

